CHEMICAL INDUSTRIES

The Chemical Business Magazine

Consulting Editorial Board
R. T. Baldwin, L. W. Bass, F. M. Becket, B. T. Brooks, J. V. N. Dorr, C. R. Downs, W. M. Grosvenor, W. S. Landis, and M. C. Whitaker.

ADVERTISING PAGES REMOVED

Wool and Wrappings

CASEIN is beginning to cross those barriers of restricted chemical use which the comparatively high cost of its plastics and coatings derivatives had seemed to indicate. Those who reasoned logically that this interesting and valuable raw material was thus doomed to rather limited employment, find some satisfaction in the fact that the new uses opening up are made promising by lower cost factors in favor of casein in the operating rather than the strictly chemical items of the budget. These new developments exemplify again the very great versatility of chemical processing as compared with mechanical fabricating.

It is no longer a secret that the Kraft-Phenix and the National Dairy interests are joining forces in the building of a new and much larger casein wrapping plant at Chicago. Behind this project is a stout backlog of demand, for its product will supply not only the cheese company, but also five large candy makers. Chicago is the stronghold of the "nickel package," the bar or roll of candy which as a class includes the biggest sellers in all the confectionery trade. Accordingly, this demand is potentially a very substantial one even in the terms of modern wrapping figures. It is significant that this market has been won chiefly from waxed papers and in head-on competition with cellulose transparent sheetings. Moreover, the cost of packaging low price candy is a matter that very directly concerns the profits of makers, which makes their choice of casein sheeting an important victory.

Casein is also preparing to come into competition with cheap, abundant cellulose in the fibre field. The National Dairy people are going ahead rapidly with their "synthetic wool" plant at Bristol, R. I. It is here that the new cost angle becomes apparent. The construction cost of the new Industrial Rayon plant (which we illustrated in our December issue as the archtype of the latest word in synthetic fibre manufacture) has been figured out to be close to 80 cents per pound-year. The pound-year construction costs of this new casein fibre plant are reported by Frank C. Atwood to be not greater than three cents.

Initial plant investment is apt to be an exceedingly important element in a young industry such as synthetic fibres where improved processes press thick and fast, and with raw silk at $1.94 and raw wool at 85 cents a pound it does not require a slide rule to calculate some of the advantages of saving nearly a third in this construction cost item in favor of a newcomer in the fibre market.

Williams Haynes, Editorial Director; W. J. Murphy, Managing Editor; A. M. Corbet, Associate Editor; W.F. George, Advertising Manager; L. Chas. Todaro, Circulation Manager; J. Burt, Production Manager.

Nylon and Hosiery

Synthetic chemical costs lower than those of the natural materials with which they are in competition have become during the past two decades familiar industrial phenomena. The implications of a synthetic price that is higher, yet because of superior qualities is justified economically, are not so well understood. Small wonder, therefore, that the hosiery manufacturers are disturbed by speculations as to just how nylon will affect their business.

At their recent trade meeting one gathered that they were quite reconciled to the possibilities of this new fibre replacing silk. This they could comprehend and its effects can therefore be discounted. But the effects of the longer-wearing qualities of nylon frighten them because they threaten readjustments that cannot be foretold.

Their own statistics give a current annual consumption of forty-two million dozen pairs of women's stockings. Dr. George W. Taylor of the University of Pennsylvania prophesied, on the basis of past growth, a 50 million dozen market within the next ten years. If the superiorities of nylon are anything like what rumor is saying, then it is likely that the market forecast will have to be radically revised. The hosiery makers feel that something should be done about it, so they passed a resolution condemning the three-shift working day.

They overlook what immediately occurs to any chemical man. Nylon, so it is understood, will not be a cheap material when it first comes to the market, and it will be chiefly competitive with silk upon a quality basis. We may be sure, however, that the costs will be lowered; and we may expect that the quality will be even further improved. These revisions downward in price and upward in quality will take some time, and we suspect that in the end more and better stockings will be sold.

Salt Cake from Spent Caustic

That moderate quantities of recoverable sodium sulfate are present in the end lyes of artificial cellulose fibre and staple fibre manufacture is not news. In the past, however, the cost of the relatively expensive double conversion operations necessary to recover this by-product material could not economically compete with salt cake obtained as a by-product of muriatic acid production. From Germany come rumors of a production of a few thousand tons of salt cake from this source in '39, with plans for steadily increasing output to 150,000 tons over a 10-year period. The plan is said to have official benediction, despite opposition by the salt cake cartel. It is difficult to believe that any revolutionary technical improvement will make the recovery operations less expensive. But totalitarian economics being what they are, it is possible that financial aid may be supplied to promote the staple fibre industry.

Outlook in Mercury

Italian intervention in Spain will not end until a Franco victory—this was made plain to Mr. Chamberlain during his visit to Rome—and with Italy in control of the rich Spanish mines present mercury prices are likely to tend towards higher price levels in world markets in the future. Violent fluctuations have characterized this commodity since the time of Aristotle, but the long-range trend is now likely to be upward. However, as Charles S. Wehrly points out in his highly informative review of the commodity which begins in this issue, not all the factors are political.

Less mercury will probably be consumed in actual chemical manufacture. Potentially the largest use is in the generation of power, but requirements for this purpose must of necessity be intermittent.

Coe's Patent Proposal

Those who expected that Patent Commissioner Conway P. Coe testifying before the Temporary National Economic Committee would make sensational disclosures of monopolistic patent abuses were disappointed. While many disagree in part with Mr. Coe's seven-point plan of patent law revision, it is not revolutionary in character, nor does it contain ideas that have not been advanced before. The proposal for a single Court of Patent Appeals is highly controversial, as was clearly demonstrated in the symposium conducted by CHEMICAL INDUSTRIES exactly two years ago.

The testimony of Mr. Coe that since the first anti-trust legislation in 1890, the patent laws and the anti-trust laws have co-existed without an irreconcilable conflict between them is significant. He also materially aided clear, practical thinking when he stressed the fact that without patents, speculative capital will not flow into the development of inventions. It is noteworthy, too, that the Commissioner does not suggest the licensing of patents, but that he did state that since the Constitution confers a complete monopoly upon patentees for the duration of a patent it raises a question that must eventually be met—constitutionality of an attempt to compel the owner of a patent to share with others the title, use and availability of his property.

Mercury Down the Ages

Part I

By Charles S. Wehrly

Charles S. Wehrly, widely known authority on the subject of mercury, goes back to the days of Aristotle in the third century as a starting point in his detailed and comprehensive review of the historical, political and commercial aspects of "liquid silver." In Part 1 he treats largely of the history of quicksilver, in Part 2, to be published in the March issue, he surveys the production, uses, economics, and international relationships that make mercury one of the most interesting of our important natural raw materials entering into the chemical and allied fields.

NEWSPAPER Headlines: Dentists in Convention—Wins National Open—New Synthetic Fabrics—Hurricane Warnings—New Hospital Dedicated—Railways Fighting for Supremacy—Showing of Felt Hats—Public Utilities Plan Expansion—London Gold Price Advances—Navy Plans New Ships—War Threatens! Diversified, yes, but through them all runs the silver ribbon of the metal mercury.

Produced in smaller quantities than any common metal excepting gold, yet having an intrinsic value exceeded only by gold and silver, mercury has occupied an important place in scientific and industrial worlds for centuries. Mines have been owned and coveted by kings. Political intrigue has centered about them. Vast fortunes have been made and lost with the flow of the metal.

Mercury retains its position since for most uses there is no substitute. It is the only metal fluid at ordinary temperatures. It has a high specific gravity and a constant rate of expansion. It is slow to oxidize (thus permitting indefinite storage), represents compact value and, freed from the restrictions imposed upon gold and silver, a wide demand coupled with fluctuating markets, combine to make mercury an ideal trading commodity.

The goal of the alchemists, and in other phraseology the aim of the moderns, has been the transmutation of metals. The alchemists held their profession to be a holy one and the first recorded mention of mercury, by Aristotle in the third century, B.C., refers to its use in religious ceremonies. Theophratus, his pupil, produced mercury by the treatment of cinnabar with vinegar. Tin and copper amalgams were known to the ancient Egyptians who from the sixth century onward frequently mention mercury, its uses, and preparation. The theory that all matter had its origin in a composite of mercury and sulfur was widely held and was opposed only by those who merely added another element and called a mixture of the three the mother of all metals. The term mercury, however, was not used to define the metal but to express malleability and lustre. In the first century Dioscorides and Pliny used mercury as a medicinal ointment. Paracelsus developed its use as a specific for skin diseases.

Theophratus knew of the Almaden Mines in Spain. The Etruscans, Greeks, and Romans worked the Monte Amiata Mines in Italy. The first recorded working of the Idria Mine in Italy dates to 1490 and of the mines in Peru to 1571.

Nevertheless, so little was known of its properties that mercury occupied a singular position midway between the metals and non-metals until in 1759 J. A. Braune by freezing showed definitely its true character. Developments in the use of mercury have marked periods in world history. The amalgamation of silver in Mexico in the fifteenth century; the barometer (invented in 1643); the thermometer (1720); the production of fulminate in 1799, and the amalgamation of gold in California in 1849, have been steps in scientific development and important eras in the affairs of nations.

While there are a number of mercurial ores, the red sulfide or possibly polysulfide, known as cinnabar is the only mineral responsible for commercial supplies of the metal. It is believed that this ore was formed by the mineralization of alkaline sulfide solutions—hence its occurrence in volcanic regions. Likewise, because of its character deep mines are exceptions and native mercury is seldom found except in small pockets. The ore may be found in association with basalt, quartzite, pyrite, limestone, sandstone and shale. In all cases, however, there must either be a porous body or geological conditions favorable to the retention of the mineralized solution. Prospectors may find the ore in zones of either hard or soft outcroppings and detect its presence by panning.

There is hardly a section of the world in which quicksilver has not been found. We can follow the West Coast of America from Alaska through British Columbia to the Rio Grande, go into Mexico, Central America, Chile, and Peru and find deposits accounting for a portion of the world's output and, in times past, a major portion. Spain, Italy, Germany, Czechoslovakia, Russia, Turkey, and Algiers are all producers. Mercury has been commercially mined in Australia and New Zealand.

Although the Imperial Government offered a bonus of eight cents per pound on the first one hundred thousand pounds produced in New Zealand only eighteen flasks were mined in 1937, presumably from the Puhi Puhi property. Australia reported twelve flasks for the same year with indications of activity in the Kilkivan field. The Ras-El-Ma Mine in Algiers, operated under the guidance of the French Government, has

not fulfilled hopes held for it and the production dropped from 1184 flasks in 1932 to 116 flasks in 1937. The Turkish properties at the Kara-Burnu Mines did at times produce over 1,000 flasks annually which dropped to between 250 and 500, but was increased in 1936 because of the Spanish situation to 836 flasks. The l'Oued el Madena Mine in Tunisia started production in 1935 and in 1936 produced about 70 flasks.

One of the oldest mercury mines in history located at Lemberg, Western Palatinate, was first worked in the twelfth or thirteenth century by the Cistercian Monks and then closed in 1842. In 1935 the Montan A/G Wiesbaden reopened this mine obtaining about 120 flasks. The ore contains only four pounds of metal per metric ton and costs are undoubtedly high. The mine apparently subsidized by the Government produced 1093 flasks in 1936. While there are independent properties in Czechoslovakia, the French Government became interested in mines located in that country and in 1932 through the Societe La Cinabre commenced operations at Mernik. Production for all Czechoslovakia was 1300 flasks in 1932, dropped to 194 flasks in 1933 but increased to 1876 in 1936. China produces a quantity of mercury from mines in the Province of Kweichow and exports over the last five years have varied from 1300 to 3000 flasks.

Production in the Eighteenth Century

During the seventeenth century the richest mine in the world was the Santa Barbara at Huancavela in Peru. Production was started in 1566 and up to 1790 this mine had produced over a million and a quarter flasks. In the eighteenth century alone five hundred thousand odd flasks were mined, but the life of the mine was measured and output declined until in 1839 the mine was abandoned. In 1915 an attempt was made to reopen this property, but after an expenditure of over half a million dollars the effort was given up. Probably mercury from this source led to the development of silver and gold amalgamation. Mercury ores have long been worked in Russia and recently deposits in South Kirghizia have been prospected. Production at the old plant at Nikitovka was speeded up with new equipment so that the output has jumped from 3700 flasks in 1929 to 8700 flasks in 1935 with prospects for larger amounts. A new development is in the Bridge River Valley, British Columbia, from which, however, no production reports have as yet been received.

In all of these countries, however, we are dealing with either worn out properties, new ventures, or productions mainly consumed domestically. For the past eighty years trade in mercury has depended on the production of four countries, Spain, Italy, United States, and Mexico. This statement must, however, be qualified to the extent that the Idria mine in Italy was up to 1920 the property of the Austrian-Hungarian Crown. With the exception of the period 1870 to 1874 the United States, prior to 1915, was the largest producer in the world with Spain and Italy following in order. Positions changed after that year with Italy taking the lead and the United States second for a period of three years when in 1919 production in this country declined to a point where we are now third with Italy occupying first position. In 1935—later comparable figures being unavailable because of the Spanish revolution—Spain produced 35,600 flasks, Italy 28,191, United States 17,518 and Mexico 6,277. Reports show a continual decline for Italy from 58,000 flasks in 1929 to a low of 12,804 in 1934 but an increase in 1937 to a record output of 66,777 flasks. Spain in 1930, 1931 and 1933 produced but 19,000 flasks annually. Mexican production at present is at the 1930 level of over 5000 flasks. Output in the United States dropped badly from 25,000 in 1931 to 9,669 in 1933, but has increased to approximately 16,500 for 1936 and 1937. These countries are responsible for the world's trade in quicksilver, and remembering that since 1918 (with the exception of 1930, 1931, 1932 and 1935) the United States imports over 10,000 flasks to satisfy its needs, it is to the other three countries that the world must look for its supplies.

Strategic Positions of Spain and Italy

The strategic positions of Spain and Italy are further emphasized by the arrangements in which combined outputs have been pooled and sold through a common selling agent.

Located at the extreme western point of the Province of Ciudad Real in Spain is the Almaden Mine. This mine, worked from Roman times, was from 1525 to 1645, when the Government took control, owned by the Fuggers, who were probably the world's most successful mercury merchants since they also contracted for what was then the Austrian production which was, in turn, sold to Mexico for amalgamation purposes at a handsome profit. The town of Almaden is centered about the mine and being dependent upon the mine for their livelihood, labor has opposed improved mechanical processes. Politics arising from Government ownership have played an important part in the history of the property. Convict labor was at one time used, but such is not now the case and laborers enjoy good working conditions. The mine has been excavated to a depth of over 2000 feet and now extends to the thirteenth level. Prior to 1923, furnaces, built in 1646, were still in use but, at that time, the Council of Administration decided to modernize the equipment over labor's protest. This mine has accounted for over 99% of Spain's output and since 1920 has produced about 557,000 flasks. Various estimates are made as to reserves, but all previous guesses have been incorrect and no authentic statement is available. Neither is any correct data given as to the tenor of the ore as official government reports show a variation of from 4½% to 11.7%, but one can safely assume that the ore contains between 7% and 14%, a factor which alone can account for the mine's preemi-

nence. Certainly it is the oldest and most prolific mine in the world.

Prior to 1918 Austria and Italy vied with each other in the production of the metal, Austria in 1910 accounting for 20,400 and Italy 26,300 flasks. The control of the mines located in these countries was merged as a result of the World War when in November, 1918, the Italians supervised the workings of the Austrian technical staff and commandeered the metal through their War Department. By the Treaty of Rapallo (Nov. 12, 1920) this rich Austrian property became an Italian possession. This property known as the Idria mine has had a most interesting history. Located in the Julian Alps about 28 miles northeast of Trieste on the Idria River the property extends completely under the town of Idria which consists of a population of 1,000 people dependent almost entirely upon the mine itself. The deposit, according to one report, was discovered in 1470 by an Italian noble. Other reports give credit to an Italian peasant for its location in 1497. Mining was started under the rule of the Venetian Republic, but so successful were operations that Maxmillian, the Emperor of Austria in either 1508 or 1509, took the territory by force. In 1516 it was returned to the Venetians by the Treaty of Noyan and from then until 1580 there is some confusion as to exactly who did operate the property. In 1580 the Hapsburgs purchased the mine and with the exception of the years 1797 to 1813, when Napoleon and the King of Sweden were interested parties, held it until 1918. Recent reports estimate the life of this mine at ten years or more with an output of 15,000 flasks per year. At present there are four or five shafts in active production extending to a depth of 1200 feet and a furnace capacity of 500 tons a day. The ore is not rich, assaying but .75%, but the mine has recently accounted for about 50% of Italy's production.

Most Extensive Mines in the World

About half-way between Rome and Florence is located the famous Monte Amiata District, including within its limit the well-known Abbadia-San Salvador, Siele and Mercurifera Mines. Here again the regal hand appears as it is believed that the most important mines were the personal property of the German Emperor before the war. Unfortunately, little data is available on the early history of this group of mines, but for many years they did provide about three-quarters of the Italian output from ore assaying about 1%. Reserves are estimated to last at least twenty years with an annual production rate of 45,000 flasks. This group deserves the title of the most extensive mines in the world. Once dominated by the Monte Amiata S. A. M., mounting stocks forced a Government bank to step in and all properties are now under the control of the Italian Government. The value of these properties are in their potential tremendous output.

A vast difference distinguishes mercury mining on the Continent and in North America. Although the United States and Mexico have the doubtful honor of possessing a far greater number of mines than exist elsewhere their development has been comparatively recent, their locations widely separated, the tenor of their ore averaging generally less than in Italy and greatly less than in Spain and their operations in the most part conducted by small independent miners. In Mexico these factors combined with periods of political uncertainty have joined to hold production to the maximum of about 10,000 flasks reached in 1898 with a minimum of 974 flasks in 1917. For the last five years production has averaged about 5,000 flasks. While the output of the metal in Mexico dates only from 1873, that country was one of the first users of mercury on a commercial scale. As early as 1556 Bartholome DeMedina was sent to Mexico to carry out his process of amalgamation. Mercury supplied for this purpose was produced in Spain, sold to Austria who shipped it to Mexico. This centuries old process was curiously the cause of a large percentage of Mexico's output in later years. The Fresnillo Company at its mine in Zacatecas has recovered many thousands of flasks from old Patio workings where the mercury was used to reduce silver chloride and the resulting mercurous chloride discarded to later become of value.

Production of Virgin Mercury

Virgin mercury was first produced from a deposit at Huitzuco in the State of Guerrero. Since then further properties have been opened and worked in San Luis Potosi, Chihuahua, Jalisco, and Durango. The States of Guerrero and Durango now embrace the most important deposits. The Guerrero deposits are apparently two dissociated ore bodies, one lying North of the Balsas River and extending to the borders of the state, the other being South of the river in the central part of the state. The mine at Huitzuco once owned by President Diaz was regularly worked from 1873 to 1910 and at times turned out 700 flasks a month. With revolutions, however, regular output was curtailed and the mines run by lessees in a very primitive fashion. The ore is said to have ranged from .4% to 12% of mercury. In this territory are found other mines and fairly large production has been assigned to the Huahuaxtla area in which ore has ranged from .4% to 31.9%, but the country is dry and mining difficult. The deposits in the state of San Luis Potosi are located near Guadalcazar and at one time accounted for from 500 to 700 flasks a year. The Chihuahua deposits are at San Miguel. Most recent developments have, however, taken place in Durango where the Cia Exploradoriade Durango S. A. have developed properties near Santa Marie del Oro by the installation of new furnaces. This ore is stated to test from 1.5% to 2.2%. Important factors in Mexican production are the possibility of increase because of the widespread deposits; the lack of previous intensive work; and chiefly that Mexico does not now consume the metal and thus furnishes the world with 4,000 to 7,000 flasks a year. Although this

mercury does at times enter into consumption in the United States most of our recent imports have been reexported because of the policy of a European cartel to hold its United States price below that prevailing elsewhere.

Mercury was the lever which pried the vast amounts of gold from California and it is fitting that that state should have been the first to produce the metal. California still accounts for the major output in this country. Total United States production from 1850 to 1925 was 2,412,730 flasks of which California produced 2,286,057.

In 1824 Don Antonio Sunol investigated what was then thought to be a silver mine. Development on that basis failed, but in 1845 a Mexican Government Commissioner—Don Andres Costellero—started operation at a property which proved to be the most prolific in this country (over one million flasks to 1930). Paradoxically the United States today has the greatest number of mines with the lowest output per mine—a factor which is largely responsible for the uneconomic marketing of the metal. The first recorded production was in 1850—all from California—of 7723 flasks. By 1910—and it is to be noted that prior to 1911 this country exported mercury—there were nineteen mines operating, fifteen in California, two each in Nevada and Texas. In 1937, this number had increased to 101 mines, California leading with 54; Nevada next with 20; Oregon, 14; Arizona, 3; and Arkansas, Texas, and Washington with a total of 10. Mercury is found in the United States in that territory stretching along the Western Coast from Washington through Oregon into California and extending into Nevada, Arizona and Texas. Deposits in Arkansas have been worked since 1931, but production so far has not proven important. The 54 reporting mines in California in 1937 were located in sixteen counties, but chiefly in Lake County in the North, Santa Barbara County in the South with Sonomo, Napa, Contra Costa, Santa Clara, San Benito, San Luis Obispo between. Of these 54 mines, 10 or 11 account for the major production. The present largest producer is the New Idria mine in San Benito County operating since 1858. In Lake County are the Sulphur Bank Mine, first operated in 1874; the Great Western, opened in 1873, and the Mirabel, which started production in 1887. The Cloverdale Mine in Sonomo County was first reported in 1872; the Oat Hill and La Joya Mines are in Napa County, the former having been opened in 1876. In Contra Costa County is located the Mount Diabolo Mine; the Oceanic Mine is in San Luis Obispo County and was first reported in 1876. In 1937 the Sulphur Bank, Great Western, Mirabel, Oceanic and the New Idria Mines were the outstanding producers. It is interesting to note that all have been operating at least since 1887.

Oregon in 1937 mined about one-fourth of the domestic mercury and in that state the Horse Heaven, Black Butte, Wilmot, Bretz, and Opalite Mines were the largest producers. The Arkansas Quicksilver Co. and the Southwestern Quicksilver Co. both operate properties in Pike County, Arkansas. In Washington, the Roy Mining Co., Barnum McDonell and Spencer properties located in the Morton District, Lewis County, are the principal operators. Within a small radius located in Brewster County, Texas, is the Terlingua-Mariscal area. The older Terlingua or Western part was the site of original developments by the Marfa & Mariposa Co. in 1894. The Chisos Company, formerly operating in the Eastern section, have transferred their workings to the Mariposa Mine in the Western section. Here also are located the Tarrant and Waldron properties. The Rainbow mine, however, in the Eastern part is today probably the largest producer in Texas.

In 1929, Nevada produced 4764 flasks, but even though 20 mines were reported active in 1937, the total output was but 198 flasks. In 1937, Arizona produced 3 flasks. Unless further developments take place in Arkansas the states of California, Oregon and Texas will likely remain the source of most of the metal produced in this country.

Higher Cotton Oil Yield

An increase of 45,000,000 pounds in the South's annual production of cottonseed oil is made possible by the development of new automatically-controlled processing equipment in the laboratories of the Engineering Experiment Station of the University of Tennessee in cooperation with the Tennessee Valley Authority, it was announced recently by the Engineering Foundation of New York.

The research, aided by grants by the Foundation, is regarded as the first of a series of achievements which will enable cottonseed, the uses of which are daily multiplying, "to function to greater advantage in the cotton economy of the South." The University engineers see a possibility of expanding the value of cottonseed until it, rather than staple cotton, may become the principal product of the cotton plant.

Large savings are promised for other industries. The new methods for increasing the yield of oil from cottonseed can, it is pointed out, be applied to the Middle West's growing soybean industry and to other oil-seed crops such as peanuts and flaxseed.

The new developments consist of a steam pressure oil seeds cooker employing high temperatures under steam pressure for processing cottonseed and similar oleaginous materials; a seed conditioner or humidifier for delinted seed of abnormal dryness; and a hydraulic plate press with enlarged drainage capacity. In tests made over a period of two years, costs of power and fuel for the production of cottonseed oil were reduced by 25 per cent. In addition, there were important savings on the wear and tear of press cloths, made of human hair, in which the cottonseed is wrapped while in the press.

"Due to the better control conditions over cooking, it has been possible to obtain at least 10 pounds more oil per ton of cottonseed than the best experience using conventional equipment," the Foundation's announcement says. "Since some 4,500,000 tons of cottonseed are processed annually, this improved oil yield would result in an increased supply of domestically produced cottonseed oil of 45,000,000 pounds if the process and equipment were applied generally in the existing cottonseed crushing plants.

"At today's values of 7c per pound, this development is worth $3,150,000 annually in oil value to the cottonseed crushing industry without evaluating the gains to be derived from consistently efficient operations and the flexibility with respect to methods of processing that the use of the cooker permits."

Synthetic Glycerin

Can It Be Produced Competitively?

By Harold A. Levey

Chemical Consultant

INDUSTRIAL users of glycerin were much disturbed when, in March 1937, the price of the C. P. grade reached a high of 31c per pound and was at that record figure obtainable only with difficulty. This condition was suspected to be a direct result of wars and rumors of war. Actually, however, our exports were small while our imports were about double our foreign sales. The clause of the "Neutrality Act" dealing with the "prohibition of exportation of munitions to belligerents" and international credit complications checked our activities in this direction.

But the call for glycerin within our borders was probably as strong and as willing to pay the price as were the nations who needed it for militant uses. In munitions, as in industry, glycerin has encountered many competitive materials and substitutes. Explosives from glycerin are not now so great a percentage of the total as in the past.

1935 Production of Nitroglycerin

The Bureau of Mines reports that in 1935 there were produced 62,380,000 pounds of nitroglycerin requiring about 25,000,000 pounds of glycerin. However, more glycerin is now converted into nitroglycerin for dynamite for road and bridge building and mining activities. This application appears to account for about a fifth of our production. The U. S. Dept. of Foreign and Domestic Commerce releases the following figures regarding domestic production, imports and exports.

U. S. Production

Year	*Crude, 80% Pounds*	*Dynamite Pounds*	*C. P. Grade Pounds*
1931	140,001,604	43,366,048	70,527,961
1932	133,918,825	41,538,670	63,623,975
1933	119,811,648	45,634,280	58,585,438
1934	153,115,463	48,553,475	80,358,660
1935	141,184,825	48,685,282	74,704,505
1936	154,009,598	47,535,209	85,386,327
1937	169,380,709	51,793,568	92,889,111

The United States imports about 10% more than it produces. The largest supply comes from the Argentine, with the United Kingdom second. The total imports are shown in the following table.

Crude:

Year	*Pounds*	*Value*
1931	10,132,963	$ 525,599
1932	5,382,252	204,626
1933	8,473,085	246,895
1934	15,081,227	1,040,065
1935	8,220,934	656,734
1936	11,148,985	1,199,360
1937	13,598,403	2,290,568

Refined:

Year	*Pounds*	*Value*
1931	1,965,535	140,975
1932	2,347,508	142,359
1933	2,775,687	166,991
1934	2,213,942	208,989
1935	68,366	8,277
1936	3,447,487	594,036
1937	7,398,147	1,780,003

It is to be noted that our exports now average less than about 1% of domestic production. These are made up wholly of refined glycerin. For 1937 the export value averaged for the entire year nearly 25c per pound, while for previous years the value was but little over half this price.

Year	*Pounds*	*Value*	*Average price per pound*
1931	328,143	$ 48,095	14.6c
1932	260,339	28,609	11c
1933	not separately shown		
1934	not separately shown		
1935	3,353,625	450,248	13.5c
1936	1,146,026	182,592	16c
1937	1,375,036	338,148	25c

Glycerin finds such extensive use in certain American industries that some of them are volume consumers comparable with the glycerin requirements of some nations now at war. The tobacco industry is one of these. Glycerin is added as a softening agent, to maintain a given moisture content, and to give sweetness and improved flavor to the tobacco. As glycerin burns to acrolein, which is irritating to the eyes and nose, some cigarette manufacturers use ethylene glycol or di-ethylene glycol in its stead.

The coatings industry, and to some extent the molded plastics industry, have found extensive, expanding uses for resins made with glycerin. One form is the alkyd resins, condensation products of glycerin and phthalic anhydride or other polybasic acids. There were manufactured in 1935 in this country 34,312,713 pounds of this type of resin consuming about 10,000,000 pounds of glycerin which volume has probably doubled today. Ester gums are esters made from glycerin and rosin. The glyceryl phthalates are better known by their trade name, Glyptals. Hybrid resins consisting of condensations of glycerin, phthalic anhydride and rosin (abietic acid) are sold under the trade name of Teglacs.

Another industry that accounts for large volumes of glycerin is the manufacture of viscose or regenerated cellulose, embracing both rayon and Cellophane. As 7 to 10% of glycerin is used in these products, more than 20,000,000 pounds are consumed by this industry.

The rapid growth of all these industries expresses itself in advancing prices against the fairly fixed source of supply, viz., the soap and fatty acids industry where glycerin has long been considered a by-product notwithstanding that for some time past it has commanded a higher price per pound than the prime product, the fatty acid with which it was combined.

The price of glycerin has averaged around 10c per pound for more than a decade and gradually rose to a peace-time high of 31c per pound in March, 1937. This is, of course, but half the price of the war time peak in October, 1917.

Such conditions demand that the chemist consider sources of glycerin other than from the hydrolysis or saponification of fats. The great Pasteur in 1858 by careful analysis found 3.5% of glycerin in the fermented mashes of beers and wines. Shortly before the World War Neuberg and his co-workers in Germany reported on the production of glycerin from sugars by fermentation. As the supply of glycerin from fats was inadequate for the needs of Germany and her allies during the war, progress in this source of glycerin was rapid. By 1916, Connstein and Ludecke had so developed and commercialized their process, that about two dozen plants in Germany yielded more than 1000 tons per month or 24,000,000 pounds per year. This probably supplied the German war requirements.

After the World War this work was continued and improvements were made by workers in France, England, and America. With the temporary price rise du Pont produced limited amounts of glycerin from molasses by fermentation. However, the relative cost of glycerin by fermentation from sugars or sugar yielding materials is such that it can only be conducted as a wartime necessity, or during peacetime to provide for abnormal shortage when premium prices are commanded.

Because rapidly growing demands are in excess of quantities available from the fats, we review here other methods and their costs of producing glycerin from other sources. While glycerin is obtained from fermentable sugars (similar to the production of ethyl alcohol) there are, however, impressive differences in the process. Alcohol ferments in a markedly acid medium with a pH approximating 4.5. Glycerin is obtained in maximum yields in an alkaline medium within the pH range from 7.0 to 8.8. When a mash is properly fermented we obtain about 92% of the theoretical yield of ethyl alcohol and only a few per cent. of such secondary products as isoamyl alcohol and glycerin. However, when a mash is correctly prepared and controlled for the production of glycerin, a commercial yield of 75% of the theoretical (based on the weight of the fermentable sugars) would be unusually high. A large percentage of secondary products are formed, even with pure yeast cultures, including acetaldehyde, ethyl alcohol, acetic acid, pyruvic acids, and of course carbon dioxide. Which secondary products will appear and in what amounts, is determined by the type of fermentation process, the salts used, and in what quantities, the pH maintained, temperatures during the fermentation, as well as the type, purity, and hardiness of the yeast cultures and their adaptation to the environment.

In Germany, a clean, pure grade of sucrose from sugar beets is used. The sucrose is inverted to glucose and fructose as the fermentable sugars. No information seems to be available as to the use of higher polysaccharoses such as starch or cellulose, and doubtless the commercial difficulty and expense of conversion militated against the use of these products as initial materials. In the United States blackstrap molasses is the lowest price source of fermentable sugars and was the raw material employed. A number of U. S. and foreign patents have been issued covering various aspects of its use as well as the peculiar problems involved in the purification of the crude glycerin produced. In the process of concentration and refining of the glycerin from this source substantially more losses accrue than in the glycerin liquor from soap lye.

These conditions together with the large amounts of inorganic salts required to facilitate this type of fermentation make glycerin by fermentation a costly process. The secondary products have a value, and a large portion of the salts can be recovered, as such or in modified form; but notwithstanding these refunds, the direct cost of refined fermentation glycerin closely approximates 12c per pound. This figure is based on blackstrap molasses at 6c per gallon and containing 52% by weight of fermentable sugars. As refined glycerin is now 14½c per pound (Aug., 1938), and the present supplies appear to be adequate for the needs of the near future, this process would not be profitable.

We are, however, attracted by the fact that blackstrap molasses has been available from Cuba and Puerto Rico at less than half the above price or between 2c and 3c per gallon and at its sources at about 1c per gallon less. At these prices fermentation glycerin again becomes a commercial practicality. This is most promising in Puerto Rico where it may be made cheaply and brought into this country as refined glycerin duty free. Probably the factors militating against such an enterprise are first, the heavy investment of about $800,000.00 for a 20,000,000 pound per year plant, and second, the strong possibility that the few, large producers of glycerin from fats commonly would agree to reduce their price to extremely low values, and then, at a later date to redeem their losses by a rise in prices. The fact that only a few large producers control the bulk of our domestic production, together with the fact that glycerin has always been a secondary or by-product, has undoubtedly been directly responsible for inhibiting the entrance of other methods of production into commercial operation. However, as these processes become more highly developed and their costs reduced, or when their raw materials are steadily available at low figures, or when the demand for glycerin goes beyond the supply available from animal and vegetable fats plus our imports; then we can expect the commercial fermentation production of glycerin.

Methods for the chemical synthesis of glycerin have been reported for nearly seventy-five years. In the literature we find such revered names as Berthelot and Würtz who worked on this problem. These and many later syntheses in both literature and patents all have been of only academic value. The value of the raw materials, and the large number of processing operations involved, made the cost of the resulting glycerin far above the usual market price.

It is interesting to observe the reactions involved in the early synthesis proposed by Berthelot who uses calcium carbide as his initial raw material. From this he generates acetylene which he oxidizes to acetaldehyde and acetic acid. This is neutralized and dry distilled to yield acetone which is then reduced to isopropyl alcohol. This product is dehydrated to propylene which is then brominated to form 1, 2, 3 tri-brom-propane which by alkaline hydrolysis yields glycerol.

From the present methods of cracking petroleum oils substantial amounts of olefins are discharged from the stills. From the debutanizers we obtain considerable quantities of propylene. When propylene is chlorinated under the proper conditions we obtain 1, 2, 3 trichlorpropane. This product is hydrolyzed directly in an alkaline solution to glycerin. At the low price at which this gas is available, together with the ease with which these reactions can now be conducted, this process has the earmarks of an industrial future. One oil refining company has already installed equipment for the production of glycerin from this source and indicates that its production cost will approximate 8c per pound. Another company is already equipped to produce glycerin from natural gas or petroleum gases, and will begin production when they are assured of a reasonably constant market price at approximately 1938 levels. Low yields of propylene in debutanizer gases is the present unsavory aspect of this process. Its complete separation is still somewhat difficult, and as a result the glycerin from this source frequently contains traces of several glycols and polyglycols.

As much of the data regarding the production of synthetic glycerin by fermentation and chemical synthesis is included in the patent literature, a patent survey is included at the end of this article.

Thus as ethyl alcohol, initially obtained by fermentation, is now more cheaply produced by chemical synthesis from natural gas—so we will find glycerol—a trihydric alcohol—also produced more cheaply by chemical synthesis than by fermentation. The trend is definitely in this direction and away from fermentation methods. This condition is especially impressive in our changing world, when we recall that prior to the World War we were so hopeful and favorably disposed toward the production of chemical products by fermentation reactions. This attitude was largely fostered by our conception that these micro-organisms worked long hours at low wage rates. High pressure and high temperature syntheses have changed this picture. These newer methods, in addition to giving us many new chemicals, produce for us old chemicals at lower prices.

The following is a list of patents treating on the production of synthetic glycerin:

By Fermentation:

U. S. P. 1,078,580
U. S. P. 1,092,791
U. S. P. 1,147,768
U. S. P. 1,147,769
U. S. P. 1,147,770
U. S. P. 1,193,951
U. S. P. 1,288,398
U. S. P. 1,344,850
U. S. P. 1,344,851
U. S. P. 1,357,138
U. S. P. 1,368,023
U. S. P. 1,425,838
U. S. P. 1,511,754
U. S. P. 1,551,997
U. S. P. 1,678,150
U. S. P. 1,725,363
U. S. P. 1,936,497
U. S. P. 1,987,260
U. S. P. 1,990,908

Austrian Patents 3,307, 3,308, 3,309, 3,310, 3,311, 3,312, 3,313, 3,314, 3,315, 3,316 — 1916
61,497 1918

British Patents 133,331
133,328
133,374
138,099
138,330
167,034

French Patents 499,824
611,880

German Patents 298,593, 298,594, 298,595, 298,596, 303,805, 305,174, 305,175, 310,175, 310,606, 313,860, 314,446, 343,321, 347,604 — 1915 to 1918

Hungarian Patents 2,682, 2,684, 2,685, 2,686 — 1916
10,407, 10,408, 10.409, 10,410 — 1918

Hungarian Patents Cont'd
10,411, 10,412, 10,413, 10,414, 10,415, 10,416, 10,417, 10,418 — 1918

Chemical Synthesis:

U. S. P. 969,159
U. S. P. 1,180,497
U. S. P. 1,466,665
U. S. P. 1,477,113
U. S. P. 1,626,398

Glycerol Recovery Methods:

U. S. P. 1,416,318
U. S. P. 1,423,042
U. S. P. 1,434,850
U. S. P. 1,434,851
U. S. P. 1,474,750
U. S. P. 1,626,986
U. S. P. 1,627,040

British Patent 129,649 (1914)

French Patent 523,435 (1921)

German Patents 310,606
263,354

Hydrocarbon Fuels and Lubricants

1918—1938

By Benjamin T. Brooks, Ph.D.

IN 1938 Walter C. Teagle wrote that the petroleum industry is largely in the hands of engineers, chemists, geologists and other technical specialists. This could not as fairly have been said in 1918. To survey the outstanding developments in the field of hydrocarbon fuels and lubricants in the period 1918-1938 covers that period within which the petroleum industry, from production to the manufacture of finished products, underwent a technical renaissance unmatched in all the history of industry.

By far the most important development in the recent history of the petroleum industry was cracking: not only for its economic importance, but also for its far reaching secondary results and for the large number of engineers and chemists it brought into the industry. Other highly important influences which brought about great changes were the concurrent progress in the automotive industry with its demands for better motor fuels and lubricants and the new discoveries in ferrous metallurgy which made certain refinery operations safe at high temperatures and pressures. The increased exchange of scientific and technical information among men in the industry, publication of a substantial proportion of the researches carried out, and the meetings and publications—particularly of the Petroleum Division of the American Chemical Society (formed in 1922), the American Petroleum Institute (1919), the American Society of Automotive Engineers, American Institute of Mining and Metallurgical Engineers—played important rôles. In this very rapid transformation of refinery engineering the specialized engineering experts of well known engineering and equipment companies deserve particular credit.

Though cracking was first carried out industrially by Burton and his associates at Whiting, Indiana, in 1912-13, the production of cracked gasoline had reached about 12 million barrels in 1918, all by the Burton process. During the period under review the Burton process (shell type pressure stills) was superseded by various types of cracking-coil and cracking-coil-and-soaking-drum processes, which produced about 260 million barrels of cracked gasoline in 1937. In 1938, the Sun Oil Co. and Socony Vacuum Co. announced the installation of the Houdry process of catalytic cracking.

In 1918 natural gasoline was just beginning to assume important proportions. The figures for gasoline production in the United States in 1918 and 1936 are as follows:

Gasoline Production in the United States, 1918—1936*

	Cracked	*Straight run from crudes*	*Natural*	*Total*
1918	11,790	70,766	2,451	85,007
1936	239,620	231,287	33,817	504,724

* figures in 1,000 bbls.; from Am. Petr. Inst. (1937).

The average price of gasoline, in tank wagon, *ex tax*, decreased from 27.9 cents in 1920 to 12.5 cents, per gallon, in 1936, this decrease being due mainly to the development of cracking and other technological improvements, and to the discovery of an unprecedented number of prolific new oil fields between 1925 and 1931.

From the point of view of 1938 the petroleum industry of 1918 seems almost archaic. Others have commented on the fact that up to about 1918 the petroleum industry was curiously indifferent to adapting methods of distillation or fractionation which had been highly perfected in the alcohol and coal-tar light oil industries. On the Pacific coast the prevalence of emulsified crudes had led to the development of pipe stills, first to break the emulsions and later to effect continuous distillation. The Lewis and Cooke Patent which described the adaptation of the bubble tower to cracking stills was issued in 1920. But the adoption of bubble towers for the distillation of crude oils, cracked distillate, and other purposes in oil refineries met curious resistance. Miller and Osborne in the *Science of Petroleum* state. "The bubble tower may be said to have reached at least general toleration, if not acceptance, by *1924*, at which time its broad application to all forms of distillation may be said to have commenced."

The first commercial sized multiple stream unit was one distilling 5,000 bbls. per day, installed in 1926 for the Atlantic Refining Co. A firm of American engineers in 1937 built two units for installation abroad having a capacity of 65,000 bbls. of crude per day, each. The first so-called "combination units," using the surplus heat required in cracking operations to distill crude to obtain gasoline and clean distillate cracking stock at the same time was installed in 1928 and by 1934 a single such unit was built having a capacity of 35,000 bbls. per day. Miller and Osborne have summed up the advances in the distillation art in the petroleum industry by saying that "Today the refiner has at his

ommand the combination of high vacuum pipe still distillation, bubble tower fractionation, efficient heat exchanger systems, and modern instrument control," all of which have been developed since 1918.

High Octane Aviation Gasoline

In 1927, Col. Lindbergh flew to Paris using a gasoline which would rate as 69-octane, or about equivalent to "regular" grades of gasoline now sold for automobiles. During the World War aviation gasoline was straight run gasoline manufactured from certain selected crudes. The study of engine knock was just beginning and even with the low compressions then prevalent in automobile engines was giving some concern. Hall in England had called attention to the fact that cracked gasoline, particularly highly cracked or highly unsaturated gasolines were far superior in this respect. Benzol blends were in favor. However, with the announcement by Midgely and Boyd in 1922, of tetra-ethyl lead as an anti-knock agent, the subject of engine knock began to receive widespread attention. The automobile manufacturers, recognizing the advantages of higher compression, promptly began to increase the compression ratios of their cars. In the case of aviation gasoline the severe requirements as to chemical stability limited such gasoline to that made from selected crudes which yield straight run gasolines of about 74-75 octane number, which by the addition of 3 cc. of tetra-ethyl lead fluid per gallon give an aviation fuel of 87 to 90 octane number. More recently the advantages of 100 octane aviation fuel have been recognized at least for military purposes. This has led to the manufacture of such fuels by the following methods:

(1) Moderate-temperature hydrogenation over catalysts. By this method of hydrogenation of heavy naphthas from highly aromatic or naphthenic crudes yields of 60 per cent. per pass or ultimate yields of 80-90 per cent. of highly volatile gasoline, characterized by absence of olefins, low sulfur content, high lead susceptibility and the gum and color stability characteristic of straight run gasolines, are obtained. The A. S. T. M. octane number is about 75-78, which becomes 88.8 A. S. T. M. CFR Octane by the addition of 3 cc. of lead, or 92.9 by the Army Air Corps method.

(2) High temperature hydrogenation, yielding aviation naphthas of 81-87 A. S. T. M. octane number.

(3) Low temperature hydrogenation of highly branched olefin polymers such as di-iso-butene. Products of this type show A. S. T. M. CFR octane numbers of 90-100, without lead. Iso-octane began to be available in commercial quantities in 1935. The quantities of iso-octane potentially available at present are limited by the relatively small quantities in isobutene present in gas from cracking operations. The yield is increased somewhat by co-polymerization with normal butenes and made up to 100 octane by adding ethyl fluid.

(4) Isopropyl ether blends. In 1936 the Standard Oil Co. of New Jersey proposed the use of isopropyl ether in aviation fuel blends. A mixture of 40 per cent. of this ether and 74 octane number gasoline and 3 cc. of tetra-ethyl lead gives a fuel having a U. S. Army octane number of 100. Large quantities of isopropyl ether are potentially available in the propylene of cracking still gases.

(5) In 1938 Dr. A. E. Dunstan and his associates of the Anglo Iranian Oil Co. announced the discovery of a new method of producing iso-octane without hydrogenating crude di-iso-butene. The new reaction is the direct combination of iso-butene with iso-paraffins such as isobutane to form the desired saturated product.

It might be noted that, as of 1938, the problem of supplying our own war requirement of 100 octane aviation fuel would be very difficult and require time to build the necessary plants, but the position of the European powers in this respect, particularly Germany and Italy, is much more difficult. German planes are reported to operate also on Diesel fuel, a development not favored in the U. S. up to the present.

Straight run gasolines of the paraffinic type, such as are derived from Pennsylvania and Michigan crudes and which were formerly considered as exceptionally fine, can no longer be used satisfactorily in automobiles of present manufacture. It is now common practice to crack or "re-form" such gasolines, suffering a loss of gasoline of about twenty per cent., to improve their anti-knock value.

Polymerization

During the last five years several so-called polymerization processes have been widely installed to produce motor fuel from refinery gases and from the potentially very large amount of propane and butane available incident to the manufacture of natural gas gasoline. One process is based upon the catalytic polymerization of the unsaturated hydrocarbons in cracked refinery gases. The thermal polymerization processes are of two types, one subjecting crude propane and butane to cracking at relatively low pressures and high temperatures followed by higher pressures and lower temperatures to effect polymerization. The other thermal type of process effects cracking and polymerization in one operation, at high pressures and temperatures. In all of these so-called polymerization processes the yield of condensable motor fuel is greater than would be expected from the amount of unsaturated hydrocarbons, the saturated hydrocarbons also entering into the reactions.

Some wildly exaggerated statements have been made as to the amount of such polymer gasoline which can be produced. However the real merit that polymerization processes can claim is not that they offer an abundance of motor fuel from new sources, but that the product raises the anti-knock value of gasoline blends, and that it can be produced in sufficient quantity to be of real value when used in such blends.

No commercially satisfactory method of cracking or cracking and polymerizing methane or dry natural gas to motor fuel has been developed, the quantity of heat required being very large and the largest yield reported being about 1.44 gallons per 1000 cubic feet.

The manufacture of motor fuels and lubricants by hydrogenation plays an enormous part in the national defense programs in Germany though it has been officially condemned recently in England as not being

important in the event of a national emergency. In the United States, still enjoying a relative abundance of crude petroleum, the method (Bergius) has not yet played as important a rôle as it is probably destined to do.

Bergius started small scale experimental work on the high pressure hydrogenation of coal and tars in 1913-14, but the first large scale experimental plant was started at Mannheim-Rheinau in 1916 and with later development work in 1922-25. In 1927 the Standard Oil Co. of New Jersey joined with the German I. G. to develop the process on a large scale, two commercial plants being erected in the United States, one at Baton Rouge, La., and one at Bayway, N. J. The American plants have been directed to the hydrogenation of petroleum oils and heavy residues to special lubricating oils and special gasolines and naphthas of high anti-knock values.

The Fischer-Tropsch process, which has been developed in Germany on a large industrial scale, was an outgrowth of the earlier process (1922) of hydrogenating the carbon monoxide of water gas to a mixture of alcohols, aldehydes, ketones and fatty acids termed "Synthol." This process was carried out at high pressures (1400 lbs.). In 1925 Fischer discovered that at lower temperatures and at atmospheric pressure the reaction yielded mainly hydrocarbon oils. Six years later (1931) he was successful in discovering a catalyst which remained active for several months and gave yields somewhat better than 80 per cent. of the theory of hydrocarbons, the principal product being gasoline. The hydrocarbons produced by the Fischer process are mainly normal paraffins, requiring cracking or re-forming to yield satisfactory motor fuel. Lubricating oils are made by cracking the paraffins and polymerizing. The relative quantities reported by Fischer are as follows: light gasifying hydrocarbons 8%, gasoline (up to 392° F.) 62%, diesel oil 24%, paraffin and ceresin waxes 6%.

Gasoline Refining

In 1918 sulfuric acid was king of all the refining agents and was used liberally in refining cracked gasoline and lubricating oils generally. The use of sulfuric acid for these purposes is still continued in the case of high sulfur gasolines and is much less used for refining lubricating oils.

In 1924 the first commercial plant for refining cracked gasoline by means of Fuller's earth was installed and a little later the use of oxidation inhibitors in cracked gasolines to stabilize them, particularly with respect to gum formation was begun. Although many oxidation inhibitors have been proposed for this purpose, those which are now most widely used are p. benzyl aminophenol, p. butyl aminophenol, alpha naphthol, and wood tar distillate.

The sale of liquefied petroleum gases, propane and butane, began about 1922 when the movement was equivalent to 0.06 tank cars of 10,000 gal. per day. By 1937 the consumption of such liquefied petroleum gases amounted to 38.7 such tank cars per day and increasing rapidly. Though the amount of such material which is available incidental to "stabilizing" gasoline at refineries and natural gasoline plants is very large, the manufacture of polymer gasoline by cracking and polymerization is already taking the lion's share. The Phillips Petroleum Co. was the first to organize the distribution of such "liquefied gas" on a large scale through special tank cars and tank wagons from which the small pressure containers are filled.

By the end of the World War nearly all the naval vessels of the world were equipped to burn fuel oil. The world's merchant marine rapidly followed the example until in 1936 approximately 50 per cent. of the total used oil fuel, of which 40 per cent. were diesel-powered ships. Of the ships passing through the Panama Canal in 1937, 82 per cent. used fuel oil. Yet in 1936 the total gas oil, range fuel and distillate-fuel demand in the United States was 126 million barrels exceeding considerably the total fuel oil supplied to steamships (89 million bbls.). This demand of distillate fuel for heating is one fourth the total gasoline production. One interesting angle to this is that what started out about 1920 as a hopeful minor auxiliary to assist the refiner to get rid of by-product re-cycled gas oil has now become something of major concern. The consumption of domestic heating oil in 1921 was less than a million barrels. The more recent trend is shown by the fact that since 1930 this demand has increased eight times as fast as the gasoline demand (R. T. Goodwin). On account of the wide use of fuel oil in industrial operations the major uses, in 1936, are given as follows:

Gas-oil and Fuel-oil Deliveries by Uses, 1936

Heating of buildings	99,249,000 bbls.	
Steamships	89,478,000 "	
Manufacturing	65,000,000 "	(est.)
Railroads	59,290,000 "	
Oil companies	50,000,000 "	(est.)
Exports	34,280,000 "	
Range oil	27,292,000 "	
U. S. Navy, Army and misc.	25,000,000 "	
Gas and power plants	24,000,000 "	
Total	473,589,000 bbls.	

Since 1918 there has been marked improvement in diesel type engines and particularly in the direction of small types of relatively light weight. Small high speed diesels are still much more expensive than gasoline engines of corresponding power. Considerable study has been given the matter of reagents to be added to diesel oils to improve their ignition, but no standard satisfactory material has yet found acceptance. Improvement of diesel oils by solvent extraction to produce oils of greater paraffinicity and better ignition has been investigated by Egloff and his associates.

Much has happened in the field of lubricating oil manufacture since 1918. At that time a refiner was

largely dependent upon the nature of the crude available to him for the quality and character of the lubricating oil produced. Distillation was almost exclusively from shell stills by direct fire and aided by steam. Some decomposition or cracking was desired in order to obtain a pressable wax, the only other alternative being "cold settling" to remove so-called amorphous wax. Such oils commonly received very drastic treatment with sulfuric acid.

In this brief survey little but a mention of major discoveries can be made. In 1920 Wells and Southcombe advocated the addition of small percentages of fatty acid to lubricating oil, which was an improvement where such a mixture could be used. The effect of fatty acids in a lubricating oil led to much more extensive investigation, leading finally to lubricants capable of withstanding enormous bearing or gear pressures and now commonly known as extreme pressure lubricants. Among the better known addition reagents for the improvement of lubricating oils in this respect are chlorinated diphenyl ether, chlorinated diphenyl oxide, tricresyl phosphate introduced in 1934, and dichloro-stearic acid ester, also introduced in 1934.

The lubricating oils that are generally capable of withstanding enormous bearing pressure are generally compounded oils that are used in gear housings and transmissions alone and are not suitable for use in crankcases.

The Sharples centrifugal method of wax removal (1920-21) eliminated the old process of cold settling and did a great deal to establish the manufacture of heavy viscous bright stock in the mid-continent area. The first commercial solvent de-waxing process to be established was in 1927 by F. X. Govers at Lawrenceville, Ill., using acetone-benzol mixture. Liquid propane for dewaxing and removal of asphalt appears to have been developed about simultaneously by the Standard Oil Co. of Indiana, the Shell Co. in California, the Union Oil Co. of California, and the Standard Oil Co. of New Jersey, and introduced in 1933.

The solvent extraction method of refining lubricating oils by which such oils may be resolved into a paraffinic oil of the most desirable viscosity characteristics and a less desirable fraction containing also most of the coloring matter and other undesirable constituents was evidently an outgrowth of the liquid sulfur dioxide method developed by Edeleanu for refining kerosene. This method was used on kerosene in California in 1924 and on lubricating oil in 1927 though experimental work on lubricating oils had been carried out abroad much earlier. The solvent extraction method of refining lubricating oils did not really get under way, however, until the method of extraction by phenol was developed in 1930 by Stratford for the Imperial Oil Co. of Canada. This was shortly followed by the chlorex (Carbide and Carbon Chemicals Co.'s dichloroethyl ether) method, about 1932, and by the furfural method, the nitro benzol process, and the duosol process using propane and cresylic acid established on a large scale at Paulsboro in 1934.

In 1931 G. H. B. Davis and the Standard Oil Co. of New Jersey introduced "Paraflow," a condensation product made by the Friedel-Crafts reaction, small percentages of which in lubricating oil markedly lower the pour point, or cold test. In 1934 the same company introduced Paratone V. I. Additive, a highly polymerized hydrocarbon, sold in the form of 25% solution which has the effect of greatly improving the viscosity index of a lubricating oil, making its viscosity much less affected by rise in temperature.

Shortly after the war Shulze showed the effects of distilling lubricating oils under very low absolute pressures and showed that such a procedure was feasible on a large scale. Most lubricating oils are now distilled in continuously operated pipe stills under a vacuum, employing large dephlegmators and withdrawing several side streams, minimizing decomposition, the former difficulties of wax separation having been solved by the centrifuge, and the solvent dewaxing method.

Anti-oxidants have been mentioned in the case of cracked gasolines, and inhibitors are frequently used in lubricating oils, transformer oils, and other refinery products.

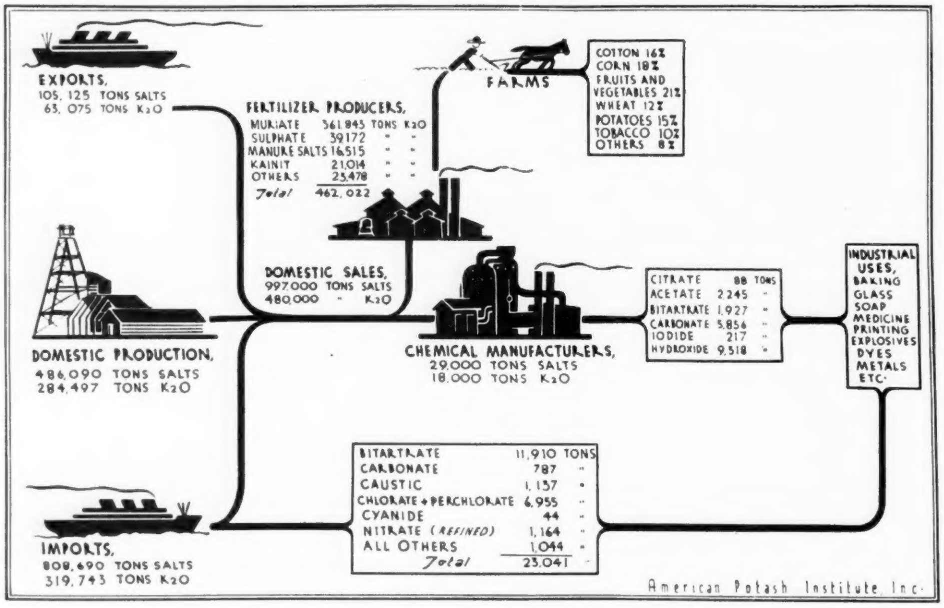
A great amount of research has been done in the fields mentioned in the present paper, but the above notes include only those developments which have already been of outstanding economic importance and have helped to make these products better and cheaper than anything known in 1918.

Electric Battery Chemicals

In a note on German trade customs in the sale of manganese dioxide and other chemicals to the electric-battery trade, contributed to the *Chemiker-Zeitung*, Dec. 14, Dr. C. Drotschmann, specialist arbitrator in regard to the galvanic-battery trade to the Berlin Chamber of Industry and Trade, says that zinc chloride for battery purposes is accepted as a material containing at least 99 per cent. actual $ZnCl_2$. It should dissolve in dilute hydrochloric acid to give a water-white solution. The iron content should be less than 0.005 per cent. Sulfates, if present, should be in traces only, while the content in basic zinc should be at the most 2 per cent. in terms of $ZnOCl_2$.

The annual consumption of chemicals, etc., for battery purposes in Germany alone, exclusive of Austria, is about 4,000 tons of manganese dioxide, 1,200 tons of salammoniac, and 2,000 tons of zinc chloride. It is only within comparatively recent years that the battery trade has learned to evaluate different brands of commercial manganese dioxide independently of their actual MnO_2 content, since it is now fully appreciated that certain natural hydrated manganese ores are really more suitable for battery purposes than products with a higher actual manganese dioxide content. Evaluation is now frequently effected, first, by determination of the speed of oxygen evolution by the sample in ammoniacal medium, and, secondly, by the electrolytic determination of its heavy metal impurities. Actual determination of the manganese dioxide content is now done principally in connection with the purchase of Caucasian pyrolusite. Many battery factories also prescribe a definite particle size and a maximum water content in the material they employ. (*Chemical Trade Journal*, Dec. 23, '38, p. 583.)

The Romance of American Potash



By Horace M. Albright

Vice-President, U. S. Potash Company

MUCH has been written about potash during the last few years. As far as the American chemical industry is concerned, however, the story of potash is one which bears repeating. It is a pleasant dream which has come true. Our forefathers produced potash from wood ashes. If they could today visit the modern efficient potash plants their amazement would probably be as great as when shown the radio.

Not many years ago the theory of the deposition of soluble potassium salts in an ancient sea was vague and complicated. It did not seem possible that Nature could repeat itself. However, Nature has repeated itself, for potash has been discovered in widely separated areas and in formations separated widely in time. These discoveries have been made in Russia, Poland, Spain, and the United States, as well as the first known deposits in Alsace and Germany.

There will never be a shortage of potash due to exhaustion of supply. After the present potash deposits are exhausted, if no new potash deposits are found, then the chemist will devise a method to utilize such minerals as alunite, leucite or feldspar as a source of supply and as a last resort, potash from the sea water is available.

The American potash industry did not spring full grown overnight. Several Federal Government agencies recognized the need of a domestic potash supply and nearly thirty years ago started an intensive search for potash. The leaders along this path of research are the geologists, chemists, business men, and engineers.

It was no ordinary research in cloistered halls or air conditioned laboratories, but a search in desert valleys and alkaline flats. There were treks in buckboards and automobiles and long hard walks. It was a sun bronzed crew in California, Nevada, Nebraska, Texas, and New Mexico that helped make potash history. A slight concentration of potash here, a crystal body there, or a promising brine in a lake or well, spurred on the research which finally met with success. Our hats are off to these men. During the World War potash was produced from lakes in Nebraska. When peace was declared these plants could not economically produce potash and were closed.

The first large scale American production of potash was from Searles Lake in California. Then came the discovery of potash in New Mexico. The Snowden McSweeney Company prospecting for oil, revealed indications of soluble potash salts. Intensive and extensive core drillings outlined the deposit. Correlations were made and a promising location for a shaft was selected. The Snowden McSweeney Company formed the American Potash Company which subsequently changed its name to the United States Potash Company. The United States Potash Company com-

The chart above is based on reports of the Bureau of Foreign and Domestic Commerce, the Bureau of Mines, the 1935 Census of Manufactures, the Potash Chapter in Mineral Industry, 1937, and statistics in the files of the American Potash Institute, Inc.

Uses of Potash

Fertilizers • Medicine • Glass • Soap • Cleaning Compounds • Safety Matches • Electroplating • Printing • Glue • Explosives • Tanning Leather • Baking • Photography • Textiles • Dyes • Lithography • Mineral Waters • Papers • Disinfectants • Bleaching • Pickling Meats • Fruit Drying • Perfumes • Analytical Chemistry • Wood Stains • Adhesives • Steel • Pyrotechnics • Bleaching Oils • Fumigants • Fly Paper • Absorbent in Military Masks

pleted its first shaft in New Mexico in January, 1931. This shaft went 1,000 feet into the ground, not through hard rock, but through soft material. Many difficulties were encountered in sinking this shaft such as moving ground, water, and gas. Each difficulty had to be overcome as the lower part of the shaft was in salt and the shaft had to be safe and dry. The strata of salts now being mined is a comparatively flat seam. No waste has yet been hoisted to the surface, although this does not mean that there are not barren areas or wastes. One visiting scientist said to a miner, "You are like a mouse living in a loaf of bread!"

Later the Potash Company of America began operations in New Mexico. There are now three plants producing approximately five hundred thousand tons of muriate of potash per year and a small quantity of potash is produced from molasses slop and cement dust.

Great credit should be given the business men, the chemists and engineers who made American potash production possible. One of the romances of the industry lies in the coincidence of discoveries of potash and the growing recognition by agricultural authorities and farmers in our country of the great need of potash for soil building. The soil acts as a chemical laboratory and warehouse.

In the chemical field, potassium is one of the most important of the chemical elements. Many of its compounds are used in medicine and the arts. A large number of these potassium salts have a limited use and therefore require a small quantity of potassium. Other potassium compounds are used in relatively large quantities and the more important of these are as follows:

The greatest tonnage of potash salts is used in fertilizers, amounting to 894,285 short tons in 1937, which consisted of muriate of potash, sulfate of potash and sulfate of potash and magnesia.

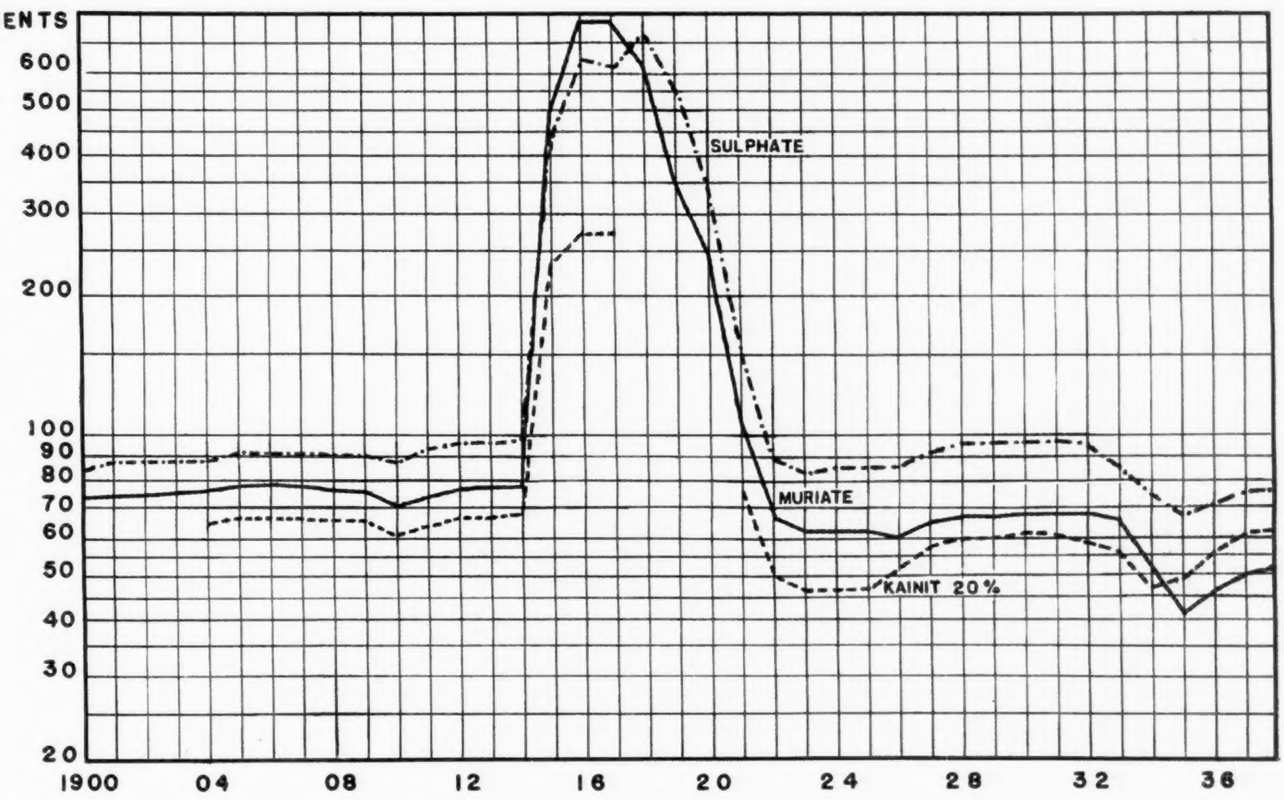
Potassium Acetate:—A dehydrating agent; reagent in analytical chemistry; medicine; crystal glass.

Potassium Bichromate:—Oxidizing agent; analytical reagent; brass pickling; electroplating; pyrotechnics; explosives; safety matches; textiles; dyeing; printing; glues; adhesives; milk and milk products preservative; chrome tanning leather; wood stains; histology; poison fly paper; process engraving and lithography; bleaching oils; photography; medicine.

Potassium Bitartrate:—Baking powder; preparation of tartrates; medicine; tinning of metals.

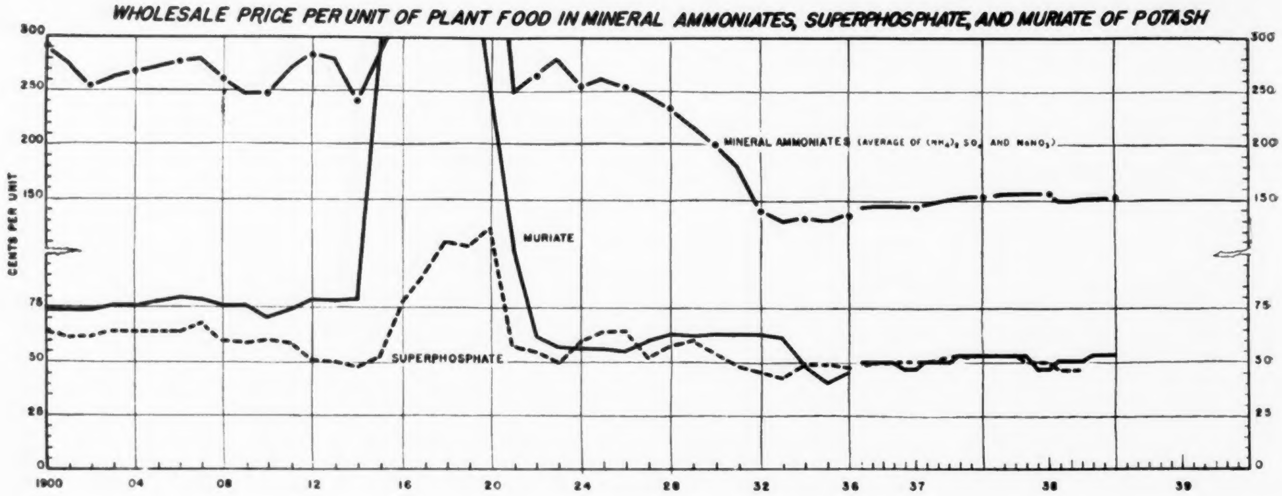
Potassium Bromide:—Medicine; photography; special soaps; process engraving; lithography.

Potassium Carbonate:—Dehydrating agent; brewing; ceramics; explosives; mineral waters; glass; tan-



Yearly average wholesale price per unit K_2O in three potash salts

WHOLESALE PRICE PER UNIT OF PLANT FOOD IN MINERAL AMMONIATES, SUPERPHOSPHATE, AND MURIATE OF POTASH



ning; electroplating; shampoo preparations; medicine; soft soaps; textiles.

Potassium Chlorate:—Oxidizing agent; explosives; matches; printing textile fabrics; pyrotechnics; percussion caps; medicine; dyes; disinfectant.

Potassium Citrate:—Medicine.

Potassium Cyanide:—Electroplating; heat treatment of steel; reagent in analytical chemistry; insecticide; fumigant; reagent in manufacture of many intermediate organic cyanogen compounds; paper manufacture; photography; engraving; lithography.

Potassium Hydroxide:—Soap; bleaching; manufacture of oxalic acid; manufacture of potassium compounds; reagent in analytical chemistry; medicine.

Potassium Iodide:—Medicine; reagent in analytical chemistry; photography.

Potassium Ferricyanide:—Calico printing; wool dyeing; tempering steel; production of pigments; electro-plating; leather; paper manufacture; blue print paper.

Potassium Ferrocyanide:—Medicine; potassium cyanide and ferricyanide; pigments; reagent in analytical chemistry; tempering steel; dyeing; explosives; process engraving and lithography; medicine.

Potassium Nitrate:—Pyrotechnics; explosives; glass; matches; pickling meats; tobacco; reagent in analytical chemistry; metallurgy; candle manufacture.

Potassium Permanganate:—Disinfectant; deodorant; oxidizing agent; reagent in analytical chemistry; wood preservative; coloring wood; dyes; bleaching textiles; medicine; manufacture of organic chemicals; absorbent for poison gases in military gas masks; bleaching and de-colorizing ethereal oils, waxes and fatty substances; purification of carbon dioxide; production of gray colors on copper; to increase the whiteness of lithopone; synthetic perfumes; dyeing; printing textile fabrics; purification of water.

Research work is being done in several fields (notably in ceramics and with potash and ice as a freezing mixture) which may increase the industrial use of potash.

The chemical maker or user can now undertake any research problem in which potash may play a prominent part with the assurance that the United States has now a permanent potash industry.

YEARLY AVERAGE WHOLESALE PRICE PER UNIT OF K_2O IN MURIATE OF POTASH

(dollars)

1920........	2.453	1930........	.681
1921........	1.050	1931........	.681
1922........	.672	1932........	.680
1923........	.628	1933........	.662
1924........	.622	1934........	.483
1925........	.624	1935........	.412
1926........	.596	1936........	.462
1927........	.646	1937........	.506
1928........	.669	1938........	.517
1929........	.672		

Bauxite Industry in '38

The recession in industrial activity during '38 was reflected in the domestic bauxite industry by declining shipments of domestic and foreign bauxite to consuming industries, according to the Bureau of Mines, U. S. Department of the Interior. Shipments from mines in the U. S. in '38 totaled only 319,000 long tons valued at $1,838,000, a decrease of 24 per cent. in quantity and 25 per cent. in value compared with '37. All of the decrease was accounted for by mines in Arkansas and Georgia, shipments from Alabama having increased. The average value per ton of all domestic shipments declined from $5.82 per ton in '37 to $5.76 in '38.

During the first eleven months of '38 bauxite imports decreased 8 per cent. compared with the corresponding '37 period and exports of bauxite and bauxite concentrates decreased 53 per cent. compared with the same period of '37. Receipts from Surinam advanced 2 per cent. over those of '37, while imports from British Guiana declined 31 per cent. Surinam accounted for 85 per cent. of the total imports from January to November, inclusive, '38, as compared with 77 per cent. in '37, whereas the percentages from British Guiana were 13 and 18, respectively. The balance of the bauxite (2 per cent.) came from Greece and Netherland India in '38. In addition to bauxite, 64 tons of aluminum hydroxide (refined bauxite) was imported from January to November, '38.

Of the eleven months exports in '38, 40,358 tons were bauxite and other aluminum ores and 13,925 tons consisted of bauxite concentrates (alumina, etc.). The respective tonnages for the corresponding period in '37 were 76,539 and 37,823. In '38 Canada again took all of the cruder materials and 3,884 tons of the bauxite concentrates (alumina, etc.). Of the other bauxite concentrates, 8,966 tons went to Norway, 1,073 to Sweden, and the balance to Denmark, China, Brazil and France.

PHOSPHORIC ACID

Made From Pure Elemental Phosphorus

Pure Elemental Phosphorus, produced from selected pebble phosphate rock, by our own electric-furnace method, is the basis of exceptional purity of "AA Quality" Phosphoric Acid.

Reagent, USP Syrupy, Pure Food and Technical grades. Also made to specification to meet the individual requirements of special processes.

"AA QUALITY" CHEMICAL PRODUCTS

Monocalcium Phosphate	Carbonate of Ammonia	Sulphuric Acid
Dicalcium Phosphate	Bone Black Pigments	Gelatins
Disodium Phosphate	Sodium Silicofluoride	Phosphorus
Trisodium Phosphate	Sod. Acid Pyro Phosphate	Phosphoric Acid

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York

33 Offices in Principal Cities in U. S., Cuba and Canada

National

INDUSTRIAL CHEMICALS

SERVING THE SYNTHETIC RESIN, PLASTIC, SOLVENT AND PLASTICIZER INDUSTRIES

Phthalic Anhydride **Maleic (Toxilic) Acid**

Maleic (Toxilic) Anhydride **Malic Acid**

Succinic Acid **Succinic Anhydride**

Fumaric Acid

DESCRIPTIVE BOOKLET SHOWING OUR COMPLETE LINE OF COAL TAR DERIVATIVES ON REQUEST

We solicit your inquiries on all organic products

NATIONAL QUALITY

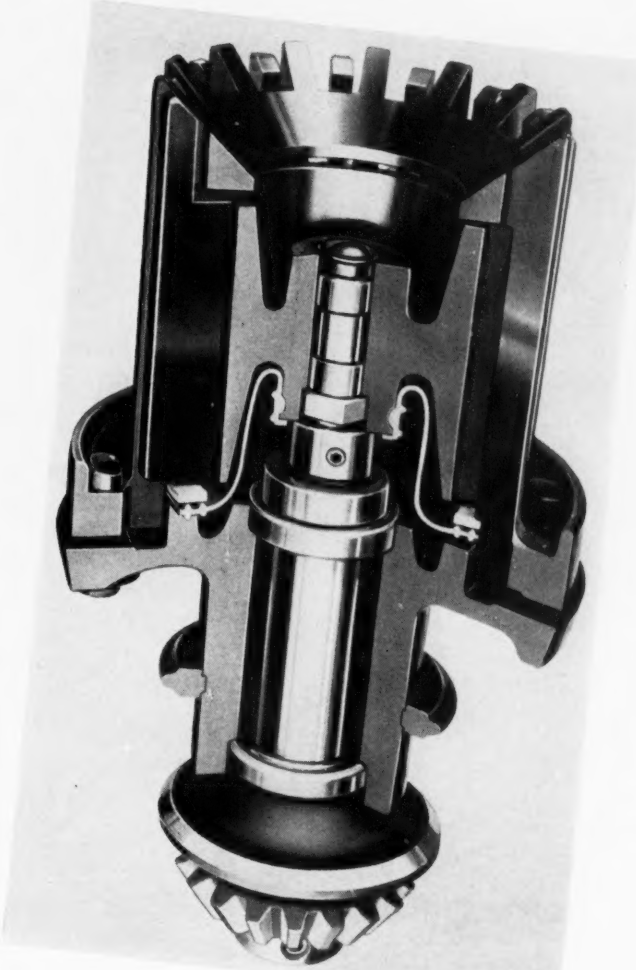
NATIONAL ANILINE & CHEMICAL CO., INC.

40 RECTOR STREET • NEW YORK, N. Y.

Branches and Distributors Throughout the World

INTERMEDIATES

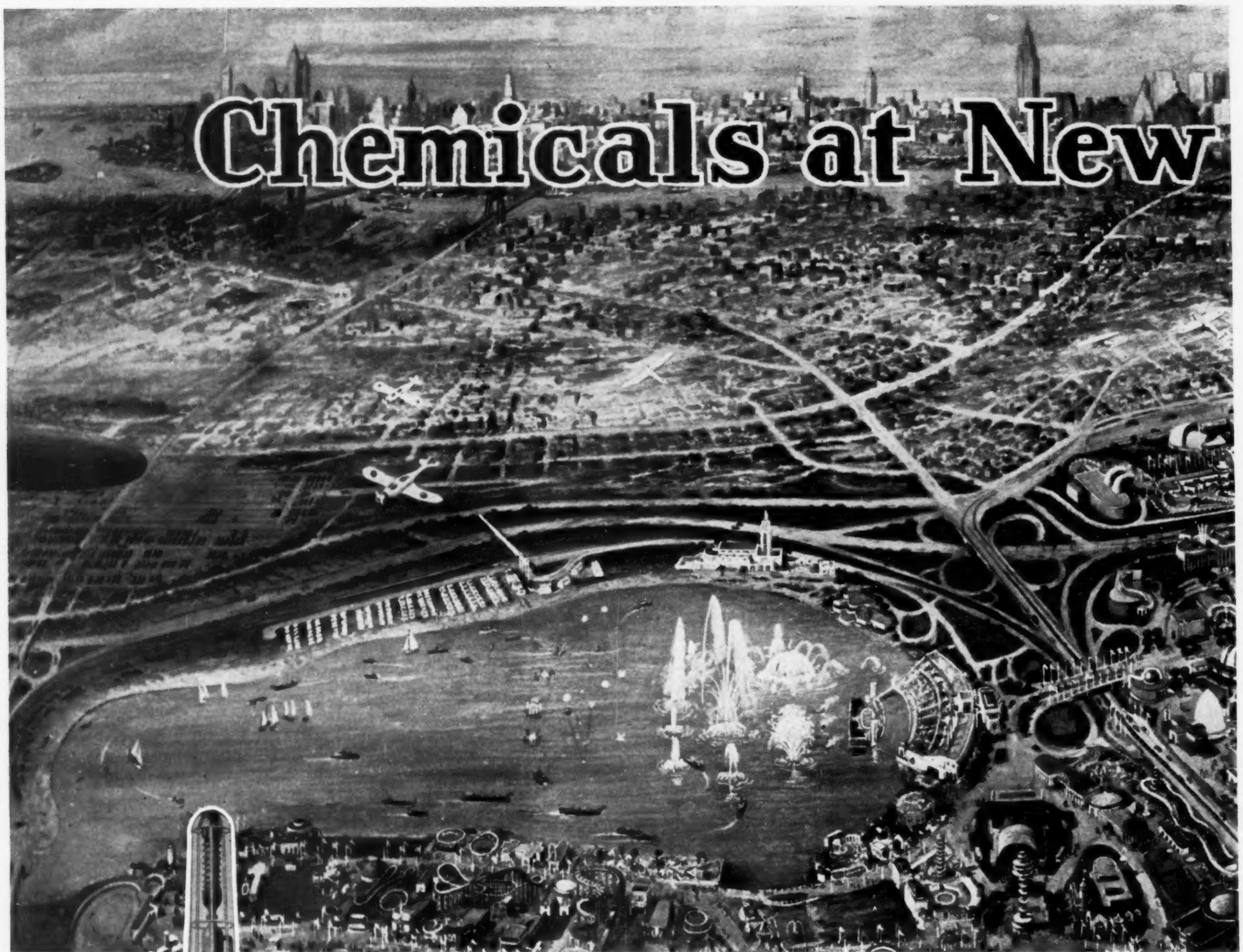
Plastics in Industry

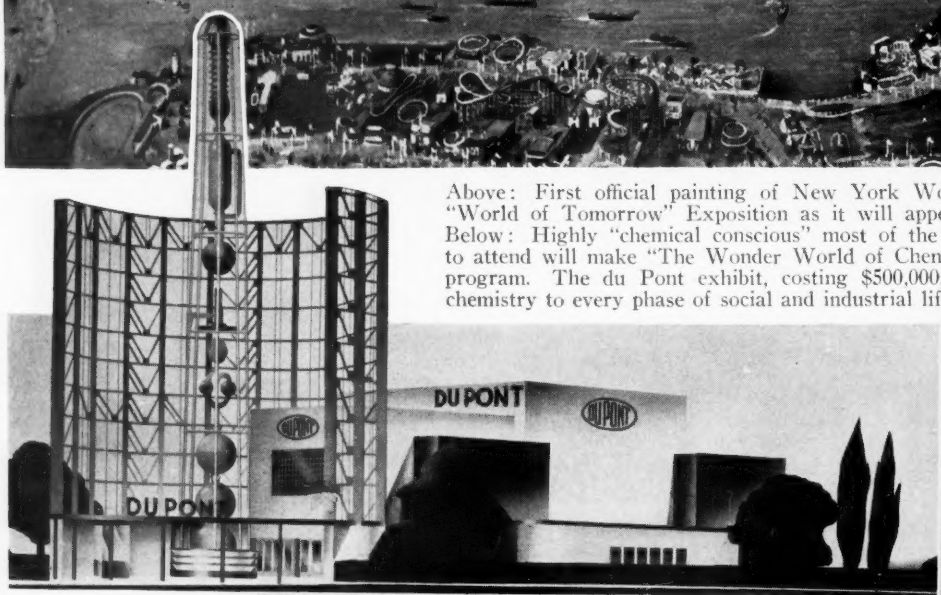


The world's first continuous viscose rayon plant was made possible by plastics! The two photographs illustrate the outside and inner workings of the ingenious, highly developed reel composed of chemically resistant molded plastic members and used in the new plant of the Industrial Rayon Corp., at Painesville, Ohio. The spinning reels were molded of Durez molding powder (General Plastics, Inc., North Tonawanda, N. Y.) and Insurok (The Richardson Company, Chicago) was used for certain molded and laminated parts.

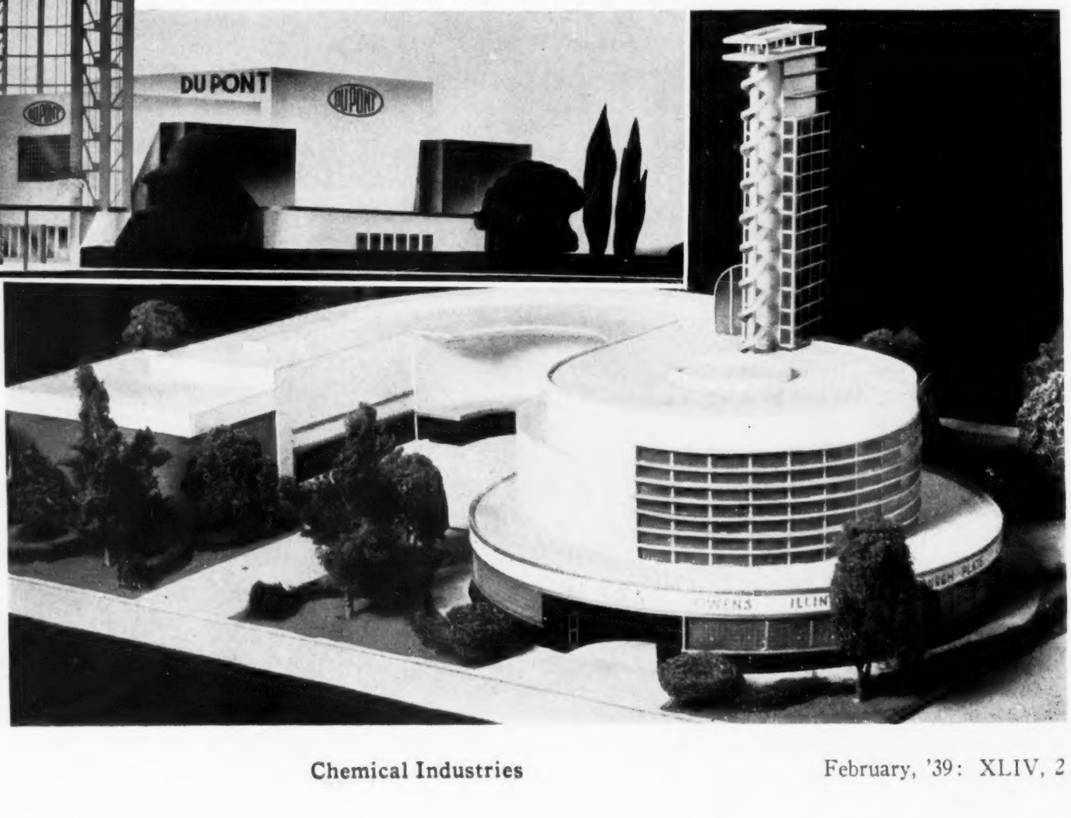
Compressed Gas Makers: The lighter side of the recent Compressed Gas Manufacturers' Association meeting. A record attendance featured the dinner on Jan. 24, the closing event of the 26th annual meeting, held at the Waldorf-Astoria in N. Y. City.

Chemicals at New





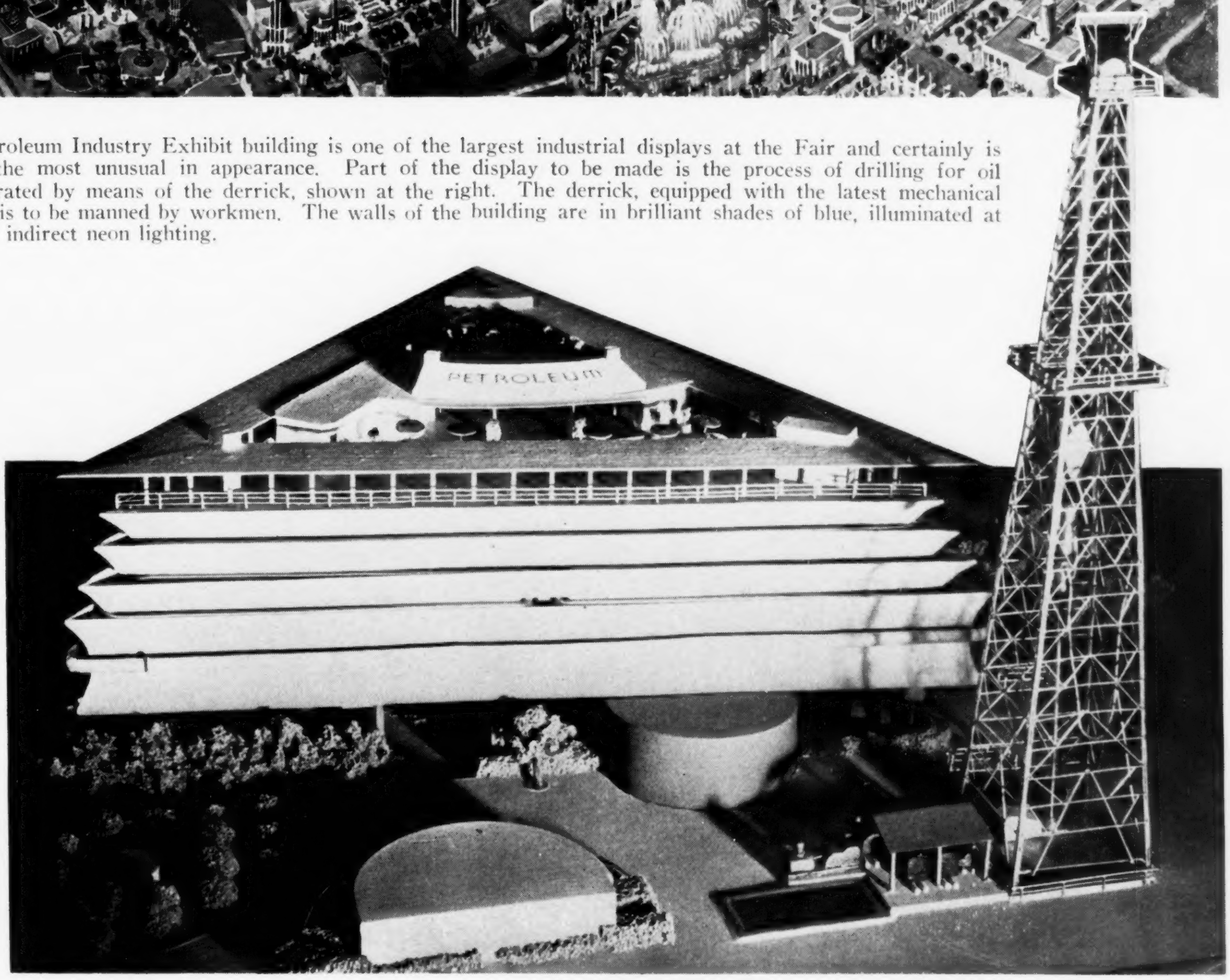
Above: First official painting of New York World's Fair, showing the $155,000,000 "World of Tomorrow" Exposition as it will appear at the gala opening on April 30. Below: Highly "chemical conscious" most of the 60 million visitors that are expected to attend will make "The Wonder World of Chemistry" a "must" on their sight-seeing program. The du Pont exhibit, costing $500,000, will dramatize the contributions of chemistry to every phase of social and industrial life.

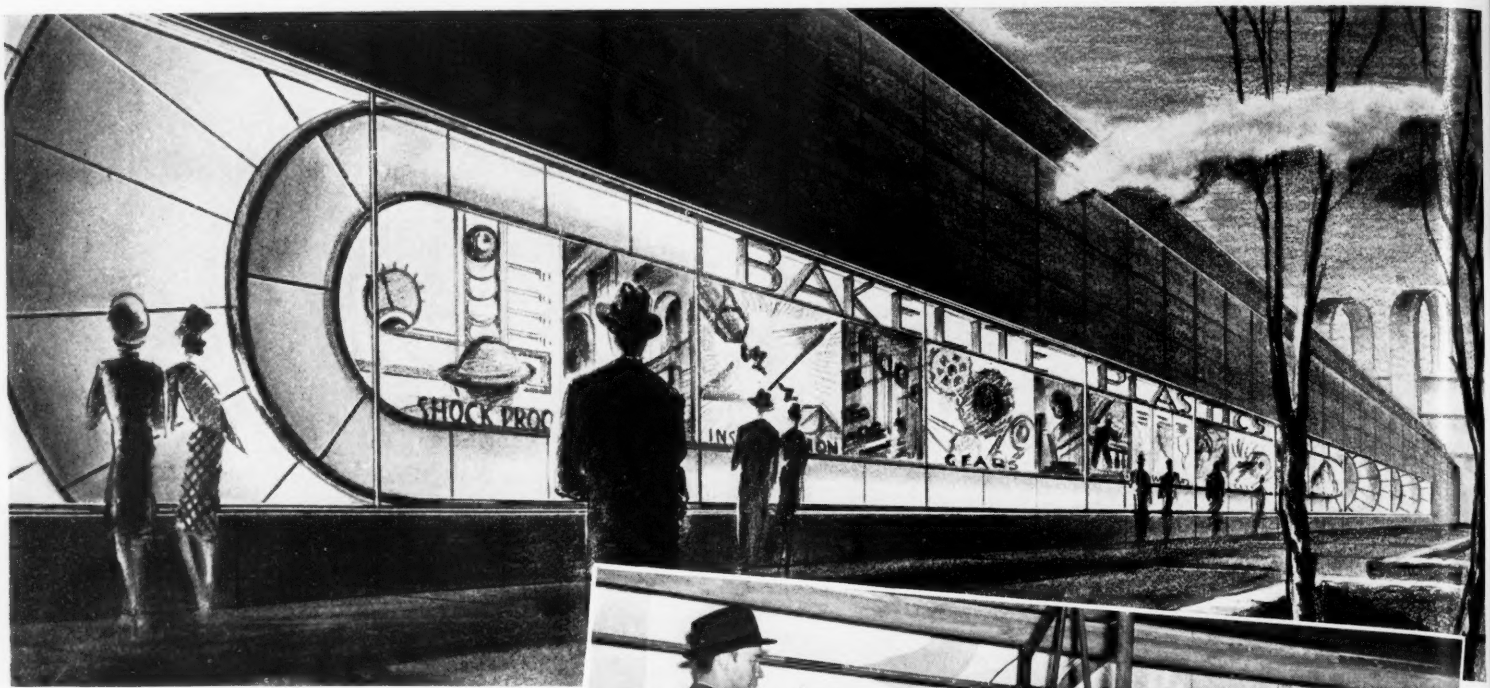


Right: A model of the Glass Center that will contain the exhibits of three leading glass companies—Corning Glass, Owens-Illinois Glass, and Pittsburgh Plate Glass. The new and revolutionary industrial uses of glass to be shown will surprise even the technically minded.

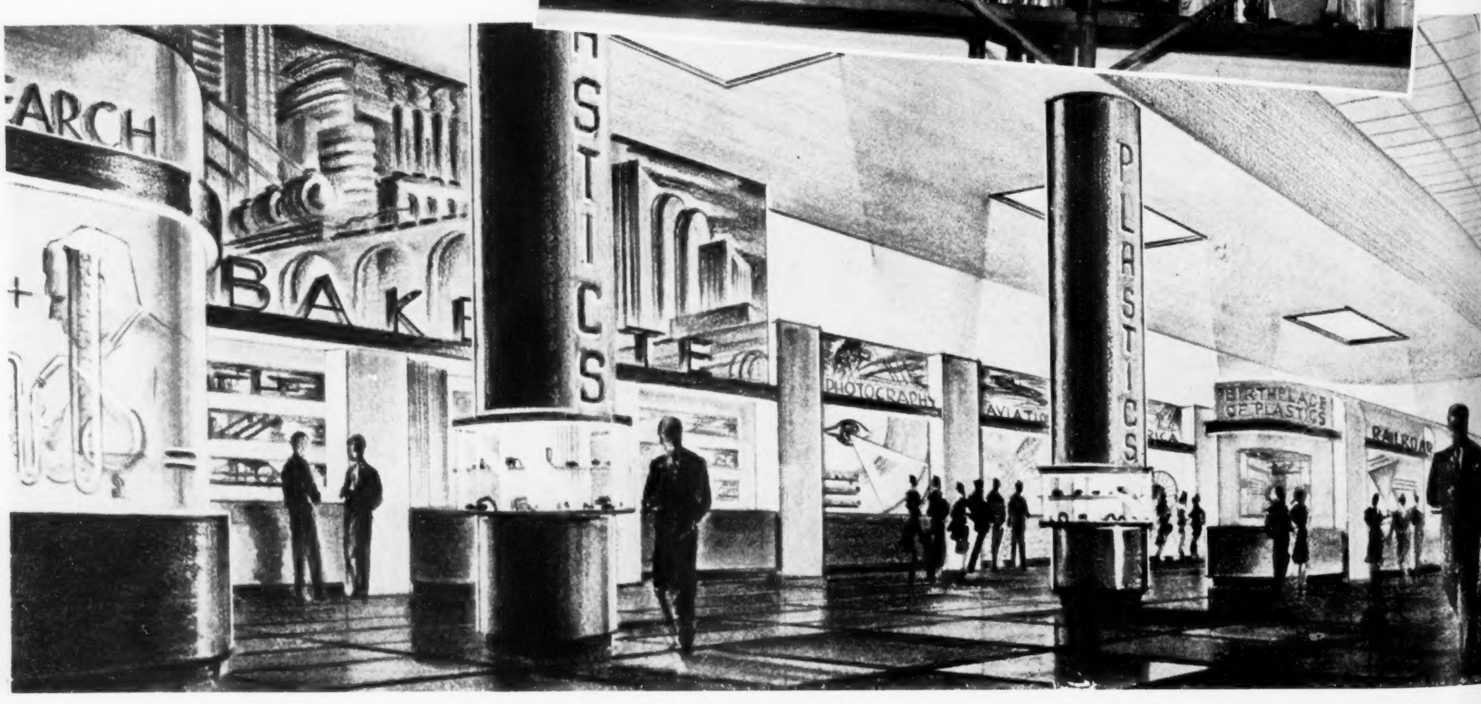
York World's Fair

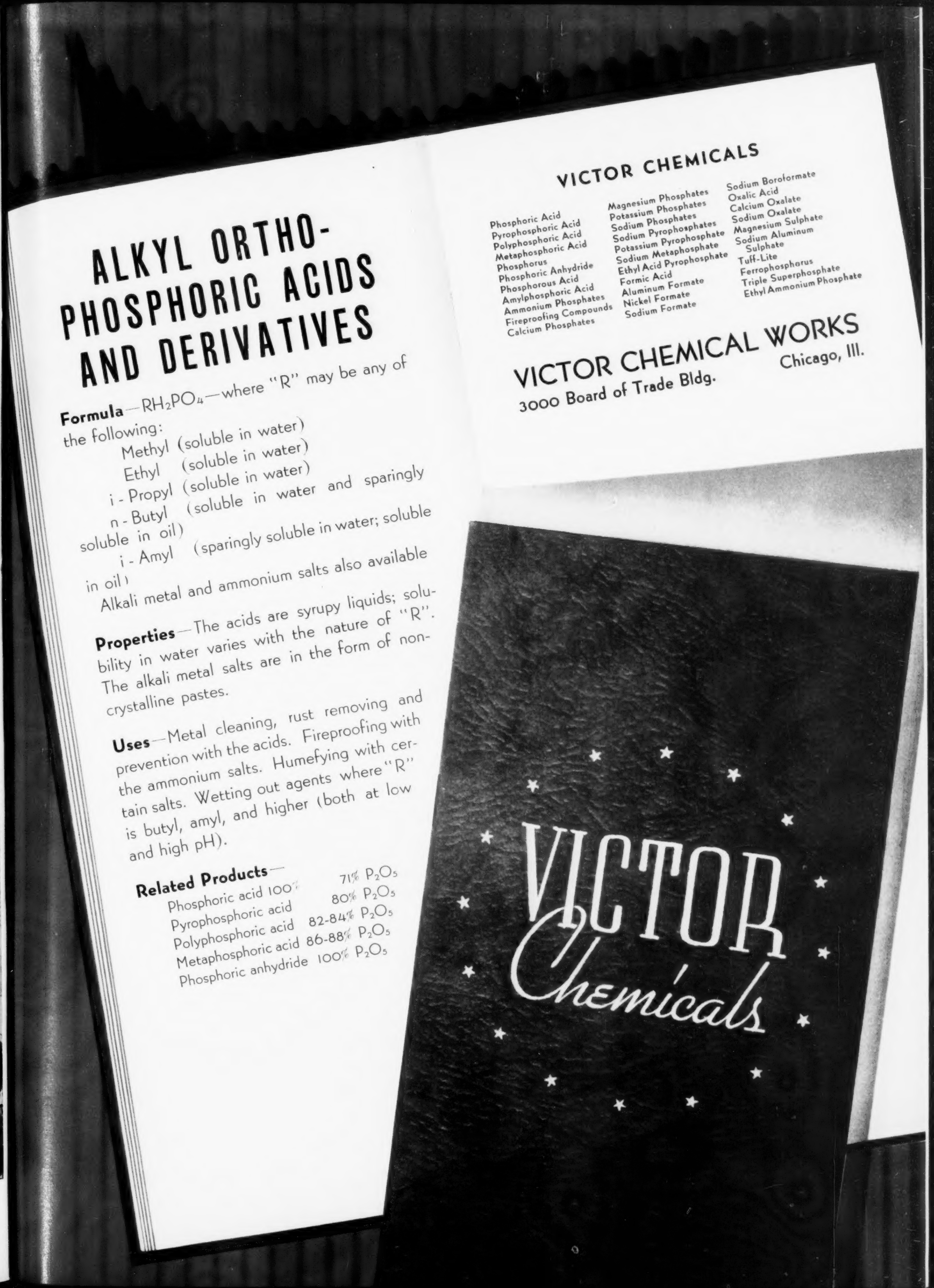
The Petroleum Industry Exhibit building is one of the largest industrial displays at the Fair and certainly is one of the most unusual in appearance. Part of the display to be made is the process of drilling for oil demonstrated by means of the derrick, shown at the right. The derrick, equipped with the latest mechanical devices, is to be manned by workmen. The walls of the building are in brilliant shades of blue, illuminated at night by indirect neon lighting.





Above and below: "Modern plastics for modern living" is the theme given to Bakelite's World's Fair 1939 exhibit which will be installed in the Hall of Industrial Science. This display will reveal to the public how modern synthetic resinous materials are fulfilling the needs of industry in everyday life in a thousand and one ways. The photograph below depicts the interior of the exhibit while the other illustrates the display windows. There will be six colorful animated windows displaying some of the unusual characteristics of Bakelite plastics, including impact resistance, dielectric properties, silent Bakelite laminated gears and high-speed abrasive wheels. Through a sound amplifying system, the passer-by will be told the role modern plastic materials are playing in the world of today and will play in the World of Tomorrow. Right: Michael Loew (left) well-known mural painter, gives instructions to a workman busy on the mural which will cover one side of the Hall of Pharmacy.





ALKYL ORTHO-PHOSPHORIC ACIDS AND DERIVATIVES

Formula—RH_2PO_4—where "R" may be any of the following:

Methyl (soluble in water)
Ethyl (soluble in water)
i - Propyl (soluble in water)
n - Butyl (soluble in water and sparingly soluble in oil)
i - Amyl (sparingly soluble in water; soluble in oil)

Alkali metal and ammonium salts also available

Properties—The acids are syrupy liquids; solubility in water varies with the nature of "R". The alkali metal salts are in the form of non-crystalline pastes.

Uses—Metal cleaning, rust removing and prevention with the acids. Fireproofing with the ammonium salts. Humefying with certain salts. Wetting out agents where "R" is butyl, amyl, and higher (both at low and high pH).

Related Products—

Phosphoric acid 100%	71% P_2O_5
Pyrophosphoric acid	80% P_2O_5
Polyphosphoric acid	82-84% P_2O_5
Metaphosphoric acid	86-88% P_2O_5
Phosphoric anhydride	100% P_2O_5

VICTOR CHEMICALS

Phosphoric Acid
Pyrophosphoric Acid
Polyphosphoric Acid
Metaphosphoric Acid
Phosphorus
Phosphoric Anhydride
Phosphorous Acid
Amylphosphoric Acid
Ammonium Phosphates
Fireproofing Compounds
Calcium Phosphates

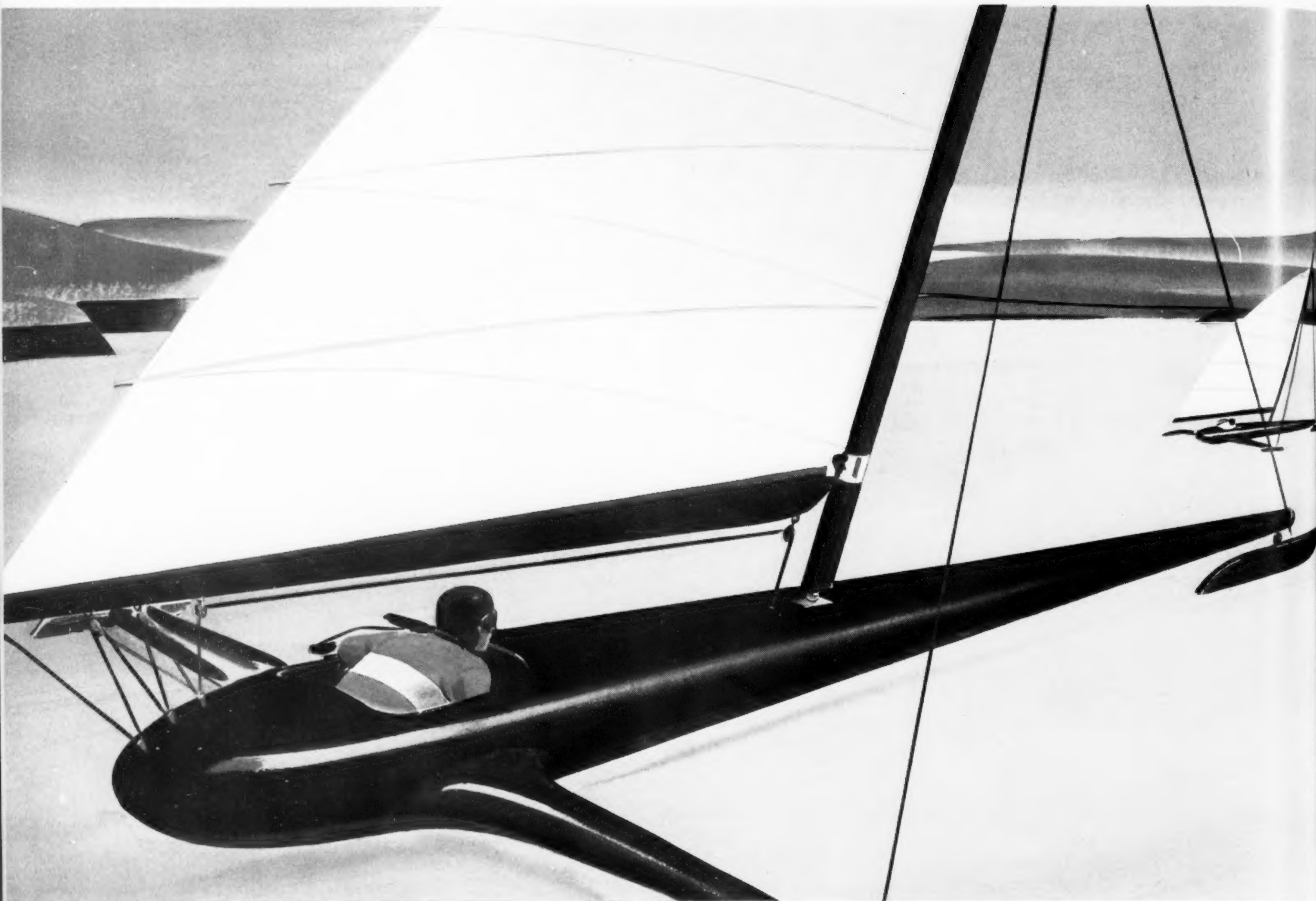
Magnesium Phosphates
Potassium Phosphates
Sodium Phosphates
Sodium Pyrophosphates
Potassium Pyrophosphate
Sodium Metaphosphate
Ethyl Acid Pyrophosphate
Formic Acid
Aluminum Formate
Nickel Formate
Sodium Formate

Sodium Boroformate
Oxalic Acid
Calcium Oxalate
Sodium Oxalate
Magnesium Sulphate
Sodium Aluminum Sulphate
Tuff-Lite
Ferrophosphorus
Triple Superphosphate
Ethyl Ammonium Phosphate

VICTOR CHEMICAL WORKS

3000 Board of Trade Bldg. Chicago, Ill.

ACCURACY



BALANCE

SPEED

Modern processing equipment operated under the vigilance of experienced personnel assures constant accuracy every step of the way.

Diamond products—because of their uniform composition—enable you to maintain a perfect balance in your operations . . . day in and day out, year in and year out.

Diamond's strategic plant location at Painesville, Ohio—plus their nation-wide warehouse stocks carried by reputable distributors,—plus an alert traffic service—assure dependable, speedy shipments when, as and where you want them.

DIAMOND ALKALI COMPANY, Pittsburgh and Everywhere

DIAMOND PRODUCTS: 58% Soda Ash . . . Bicarbonate of Soda . . . 76% Caustic Soda . . . Modified Soda . . . Liquid Chlorine . . . Carbon Tetrachloride . . . Special Alkalies

ALKALI

Plant Operation and Management

A digest of new methods and plant equipment

Filling Procedure for Ammonia Cylinders

A discussion of the single operation of filling cylinders employed in the du Pont National Ammonia plants.

By G. Hallberg

Ammonia Dept., E. I. du Pont de Nemours & Co.

FIFTY years of experience in supplying anhydrous ammonia in cylinders to the refrigeration, ice manufacturing, chemical, water treating, heat treating, oil and other industries has taught us that the primary customer's demands are:

(1) That the ammonia itself shall be consistently of specified high purity.

(2) That the container shall be in first class mechanical condition, and

(3) That the product shall be readily available at all times at a reasonable price.

The specifications under which bulk anhydrous ammonia is now being successfully produced and shipped in 50,000 pound tank cars are sufficiently rigid to satisfy the quality requirements of the most particular customers. To make this same high quality product available in the smaller package units, such as 25, 50, 100 and 150 pound cylinders, requires a high degree of care, skill, and organization in the apparently simple job of transferring a liquid from a large container to a small one.

In the course of its history the National Ammonia Division of the Du Pont Company has succeeded in developing a routine procedure, training a staff of skilled operators, and designing specialized equipment to meet the three requirements with safety, speed, and economy. It is my purpose to indicate the multiplicity of steps, with their various checks and controls that are employed in the single operation of filling cylinders in the National Ammonia plants.

In our eyes each of the thousands of our cylinders is an individual, identifiable by a serial number, whose history is carefully recorded from the time of purchase from the cylinder manufacturer to the time of condemnation and destruction as "unfit for further use". Although this system requires about 100,000 individual records, only by such a system is it possible for us to protect our customers with respect to satisfaction of product and safety of container.

Incoming empty cylinders are unloaded by the carrier at our receiving platforms. Each cylinder is weighed and the weight is checked against the last recorded tare weight of this particular cylinder. If the weight is unchanged since the last weighing, the cylinder is placed on a specially designed skid to facilitate movement to the next inspection operation. The skids hold about 20 cylinders.

If the weight of the incoming cylinder is greater than the last recorded tare weight, the cylinder obviously contains some returned material. If the returned content is an appreciable quantity, a sample is taken and a suitable credit is allowed the last customer for any of the original ammonia filling that may have been inadvertently returned.

If a cylinder weighs less than 90 per cent. of its original weight, it is immediately condemned as unfit for use. This action is in accordance with the Bureau of Explosives Regulations. If the tare weight is between 90-95 per cent. of the original cylinder weight, the cylinder is given a hydrostatic test, a safety measure of our own, not specified by the Bureau of Explosives. If this test is not satisfactorily met, the cylinder is condemned as unfit for use. Cylinders that are badly pitted on the surface, or those that have been in a fire, are condemned without further test. This drastic inspection routine is necessary to protect ourselves and our customers against accidental failure of a cylinder in use. About 6 per cent. of the incoming cylinders require special treatment or testing.

Cylinders that have passed the preliminary inspection move to the valve inspection. Here the residual ammonia gas is withdrawn and the cylinder valve is disassembled. The spindle tip is carefully inspected for mechanical defects and for evidence of oil, water, or other contamination of the interior of the cylinder. All cylinders showing evidence of oil contamination are routed to the degreasing station where they are cleaned and conditioned before being returned to the inspection line. Cylinders containing moisture are dried out.

The valve inspection is continued to insure repair or replacement of all damaged block-tin valve seats, stuffing box threads, bushings, and gaskets, and broken dipper pipes. The valve inspectors also remove any freight tags, wire, etc., from the outside of the cylinder, repolish the brass serial number tags, and clean the front and rear cylinder heads. The valve inspector's final duty is to attach to the cylinder valve a special fitting by which connection is later made to the cylinder filling manifold.

We consider that the proper care of cylinder valves is an important point in satisfactory distribution of ammonia in small packages. A leaky valve would be a decided nuisance to ourselves, the carriers, and our customers. The next step, although less important from a safety or economy standpoint, is, nevertheless, worthwhile in keeping the appearance of our packages on a par with the quality of their content.

The cylinders move from the valve inspection to the paint rack. Here they are wire-brushed and sprayed with a Bermuda asphalt, Gilsonite, paint, in a naphtha solvent. The wet cylinders are carried through a drying oven on a chain conveyer, timed to allow 1½ hours in the oven.

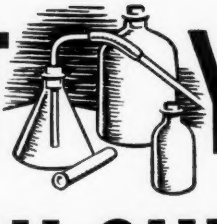
At the discharge end of the drying oven the repainted cylinders are automatically stencilled with our trade-mark and such other information as to contents as is required by Bureau of Explosives Regulations. The conveyer automatically discharges the cylinders onto the filling rack. The filling apparatus is semi-automatic and consists of:

(1) A scale on which the cylinder is filled.

(2) A Solenoid valve connecting the cylinder to a vacuum pump. This valve is operated through a mercury vacuum gauge, which also serves as a current breaker.

(3) A Solenoid filling valve operated through a Mercoid switch on the scale beam.

Reprint of paper presented at the Twenty-sixth Annual Meeting, Compressed Gas Manufacturers' Ass'n, held at the Waldorf-Astoria, New York City, January 23-24.

NO MATTER WHAT  YOU SHIP OR WHERE  YOU SHIP IT....

● **Halfway measures are dangerous measures for protecting shipments in drums. Even a *little* leakage or a *little* pilferage can damage customer good will. Only *complete* protection is adequate protection for the product you ship. And that is the kind of protection that "Tri-Sure" Closures give.**

Whether you ship your product a few miles or a few thousand miles, you can safeguard *all* of it *all the way* by equipping your drums with "Tri-Sure." "Tri-Sure" Closure Seals are positively leak-proof—they cannot be removed without deliberately destroying them. There can be no leakage or waste. No tampering or contamination. No loss of either quality or quantity.

Put "Tri-Sure" on guard over your next shipment, and make it a *100% safe* shipment—a shipment that tells your customer, "Here is exactly the quality you ordered, in exactly the quantity you paid for."

AMERICAN FLANGE & MFG. CO. INC.
30 Rockefeller Plaza, New York

Tri-Sure
DRUM CLOSURES
Make Every Shipment a Safe Shipment

(4) A Solenoid purge valve with manual shut-off. This valve has a pilot light so that the operator may know when the valve is open.

At the filling station the operator connects the cylinder to the filling manifold through a semi-metallic hose and thereafter obtains the tare weight. A vacuum is applied to the cylinder to draw off as much air as is practicable. When the vacuum has reached a predetermined value, the vacuum valve closes and the filling valve is automatically opened and liquid ammonia at about 150 pounds per square inch pressure enters the cylinder from the anhydrous ammonia storage tank. The beam of the filling scale is set for 1½ pounds more than the desired shipping quantity of ammonia. When the scale beam trips the filling valve shuts automatically and the purge valve is opened. The operator watches the scale beam until the excess 1½ pounds of ammonia gas has been purged out. This purging of the excess ammonia gas from the cylinder removes any inert gas that was not drawn out by the vacuum pump.

One experienced operator can fill from 30 to 35 cylinders per hour, depending upon the size of the cylinder. With our apparatus it takes about two minutes to fill a 50 pound cylinder and about 3½ minutes to fill a 150 pound cylinder.

Average Per Cent. of Rejected Cylinders

When the desired shipping weight has been reached the cylinder contents are sampled to check the purity of the ammonia. 100 c.c. is withdrawn from each cylinder into a 150 c.c. round bottom evaporating flask. The evaporating flask is placed in a lead cup containing brine, and the lead cup is set in a water bath to assure an even temperature. If the contents of the cylinder are of satisfactory purity, the residue, after evaporation of 100 c.c. will leave no visible stain at the bottom of the flask. Our operators have become skilful with long practice in judging the quality of the ammonia by this simple test. We average about 3 per cent. rejections, resulting from contamination inside the cylinder that had not been discovered during the previous careful inspections. The rejected cylinders are emptied, cleaned and refilled.

After sampling, the filled cylinders are rolled to a check scale where the gross weight of the cylinder is measured and the net weight figured by subtraction of the previously recorded tare weight. At this point a weight tag is written on a specially designed bookkeeping machine, which prints the cylinder number, gross, tare and net weights in triplicate. One copy of the record constitutes the weight tag which is attached to the cylinder, one copy furnishes a record of daily production, and the third copy is used for the shipping information.

After the final weighing, valve protecting caps are attached to the cylinders and the filled cylinders are loaded on the skids ready for shipping or storage.

The same procedure is followed in detail with cylinders that are used for export service except that we hydrostatically test all export cylinders of foreign make every two years at 800 pounds per square inch. Many export cylinders are registered under their serial numbers with the Customs Authorities of the countries to which they go, and once a cylinder is assigned to such export service it is generally allocated to that particular customer.

The handling of the relatively heavy steel cylinders about the plant is efficiently accomplished by the use of skids and specially designed electric lift trucks. We maintain at all times an adequate stock of filled cylinders both at our plants and at our stock points, in order that prompt service can be rendered.

It can be seen from the above description of the filling of ammonia cylinders that the job is about 10 per cent. filling, about 10 per cent. checking the quality of the product and about 80 per cent. care of the packages. With such care we are able to supply a chemical to meet commercial requirements with a purity equal to that usually attached to the terms "CP".

Production Vinyl Chloride

Vinyl chloride can be prepared by leading acetylene and hydrogen chloride at elevated temperature over active carbon supplied continuously or periodically with mercury, *e.g.*, by adding drops of mercury to the carbon or by passing the gases through heated mercury before contact with the carbon. Impure acetylene, such as that prepared by thermal or electrical treatment of hydrocarbons, may be employed. Mercury or its salts, particularly the chlorides, may originally be present in the carbon. In an example, electric arc acetylene is led with hydrogen chloride through mercury at 100° C. and then through active carbon at 130° C.; the vinyl chloride is separated by cooling and absorption on active carbon. Subject of E. P. 492,-980 described in *Chemical Trade Journal*, Jan. 6, '39, p. 20.

Drying Gases

Development of new methods for drying gases has broadened the scope of this operation, particularly in chemical and metallurgical fields.

There are four general methods by which the removal of water vapor can be effected. These are: 1. Absorption by liquids having a low water vapor pressure; 2. Adsorption by solid desiccants, a method now developing very rapidly; 3. Refrigeration; and 4, Compression.

The design of apparatus for the drying of gases by liquid absorption has been placed on a more scientific basis as result of the development of the theory of vapor transfer from gas to liquid. Sulfuric acid still leads the field for intensive drying of gases on a large scale. The chief disadvantage is the corrosive nature of the acid. Calcium chloride brine can only be used where a moderate reduction in humidity is required, but under such conditions offers the advantages of cheapness, comparative inertness and ease of regeneration. Glycerol has also been employed in liquid drying of gases.

Among solid drying agents, notable developments have taken place in the application of silica gel and activated alumina. Another solid desiccant which has recently been developed industrially is magnesium perchlorate. Under suitable conditions, silica and alumina gels will provide the degree of extreme dryness previously associated with phosphorus pentoxide, and have the added advantage that, after saturation, they can be regenerated and used again for a practically indefinite period. Magnesium perchlorate has recently been improved, so that a very high degree of dryness can be produced without impairing the physical properties of the perchlorate.

Cooling by means of refrigeration machinery is frequently used for dehumidification of large volumes of gases where a dew-point in the region of 32° F. is sufficiently low. Compression is not generally employed as a means of dehydration, unless a high pressure is required in the process itself. (Abstracted from *Industrial Gases*, Autumn Issue, '38.)

Purification of Sodium Phenate

Sodium phenate can be purified by forming at a temperature above about 50° C. an aqueous solution containing not less than 35 per cent. by weight of crude sodium phenate, cooling the solution to not lower than about 50° C. to precipitate unwanted inorganic salts, removing the precipitate thus formed and cooling the solution further to crystallize out sodium phenate hydrate, which is pure enough to be converted to salicylic acid by the known practice of dehydrating, heating with carbon dioxide under pressure and acidifying. Sodium hydroxide is preferably present in the sodium phenate solution, since it reduces the solubility of sodium phenate. The mother liquor from the sodium phenate hydrate crystals may be concentrated to yield a second crop of crystals, and the solution remaining after their removal used either for conversion of the benzene sulfonic acid to the sodium salt, or, after reinforcement with solid sodium hydroxide, for fusion of the sodium salt to produce phenol. E. P., 492,310 mentioned in *Chemical Trade Journal*, Dec. 2, '38, p. 526.

TOWER PACKING

THAT RESISTS THE DESTRUCTIVE ACTION OF ALKALIES • HYDROFLUORIC ACID SEVERE THERMAL SHOCK • ALL ACIDS EXCEPT THOSE OF HIGHLY OXIDIZING CHARACTER

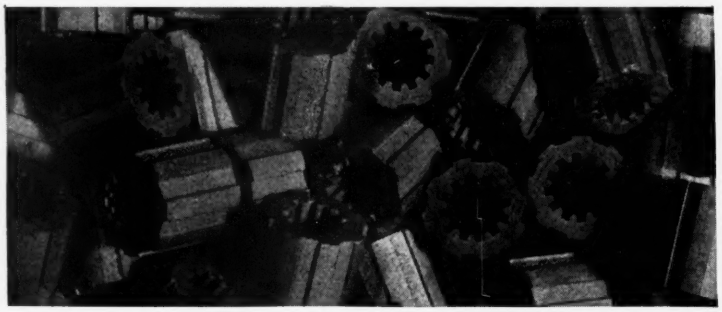
KEMPRUF
TRADE-MARK
CARBON *Raschig* RINGS

Carbon Raschig Rings are light in weight, mechanically strong and contain no soluble bond. The surface texture of these rings produces a capillary action which insures complete wetting of the ring surface. Carbon rings are showing long life and economy on the following types of applications:

- Reaction and scrubbing towers using highly corrosive agents such as concentrated caustic soda solutions at high temperatures, mixtures of hydrofluoric and phosphoric acids, or of hydrofluoric and sulphuric acids.
- Towers in which severe thermal shocks result from sudden changes in temperature.
- Rectifying towers, in the rectification of mixtures that are difficult to separate.
- Extraction systems, in which maximum interfacial surface is obtained as a result of selective wetting of the carbon rings.

Smooth Rings are made in 8 standard sizes:
¼", ½", ¾", 1", 1¼", 1½", 2" and 3"

Splined rings, as here illustrated, are made in the 1 inch size. These rings provide 25 per cent more absorption surface than 1 inch smooth rings.



OTHER "NATIONAL" CARBON PRODUCTS for applications requiring resistance to corrosion or thermal shock

"KEMPRUF" CARBON BRICK, TILE AND SPECIAL STRUCTURAL SHAPES

"KEMPRUF" CARBON FLUE GAS SCRUBBER PLATES

"KEMPRUF" CARBON GROUND RODS

"KEMPRUF" CARBON TUBES

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide UCC and Carbon Corporation
CARBON SALES DIVISION, CLEVELAND, OHIO
General Offices: 30 East 42nd Street, New York, N. Y.
Branch Sales Offices: New York Pittsburgh Chicago San Francisco

National Carbon Company, Inc., Cleveland, Ohio
Gentlemen: Please send information on the use of "KEMPRUF" Carbon Products on the following application:

Name____________________

Firm____________________

City__________ State__________

The words "National" and "Kempruf" are trade-marks of National Carbon Company, Inc. CI-2-39

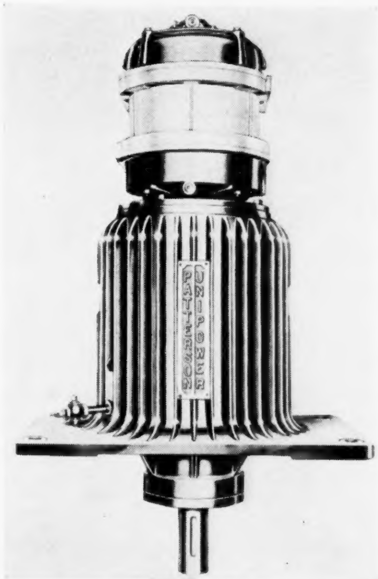
New Equipment

Vacuum Mixer for Plastic Compounds

Special mechanical features are incorporated in the design of the new single packing gland vacuum mixer recently announced by Read Machinery Co., York, Pa. Equipment is adapted for processing plastic compounds, inks, paints, phenol and urea resin compounds, and is designed to operate under full vacuum to enable evaporation of moisture or solvents at temperatures below their boiling points. The single packing gland feature eliminates all possibility of lubricant contamination of the mix because, with it, sealed vacuum chambers are provided on the bowl ends to isolate grease or oil which might be pushed out of the shaft bearings.

Unipower Agitator Drive

This new streamlined unit, redesigned and now placed on a production basis, embodies all of the rugged features of its predecessor, having heavy bed-plate and being of integral construction throughout, and retaining the patented rugged guide bearing built into the base to take care of the side thrust and torsion of the mixer shaft. Patterson Foundry & Machine Co., East Liverpool, O., in announcing this development, state that unit is equipped with anti-friction ball bearings which, under actual test conditions, have withstood continuous service at 300% of normal rating. The bearings on the output shaft are widely spaced which, together with the heavy guide bearing in the base, permits a longer overhang of mixer shaft without step bearing than is possible with any other type of drive.



Hardened and ground steel gears of the spiral type insure quiet and efficient operation. Gears and bearings are oil lubricated through means of dual plunger type pumps, independent oil reservoir being used to prevent leakage. Lubrication is visible through bull's eye built into each side of the case.

Respirator for Lead Dusts

Dupor No. 46, manufactured by H. S. Cover, So. Bend, Ind., has a twin filter area of over 46 square inches. Filters are of special felt and are adjustable, removable and easily replaced whenever desired. It is extremely light in weight and plenty of clearance has been left for spectacles or goggles. The exclusive respirator features are covered by six patents. It is approved by U. S. Bureau of Mines, B. M. 2124, for use in type "A" or Pneumoconiosis producing and lead dusts.

Combustible Gas Indicator

An improved combustible gas indicator (an instrument that measures directly the inflammability and explodibility of gas-air mixtures) is a new product of Davis Emergency Equipment Co., 55 Van Dam St., New York City. The improvements incorporated in this new model add to the convenience and reliability of the instrument, according to manufacturer.

Spectrograph

The applied research laboratories spectrograph, made by Harry W. Dietert Co., 9330 Roselawn Ave., Detroit, Mich., is now available in an improved model which is furnished with an attractive and durable cover and also with an optical bench. The cover allows the spectrograph to be operated in a lighted room. The improvements in this new model greatly facilitate the spectrographic analysis of materials, either by the emission or absorption method.

Change-Tank Mixer

For thorough and rapid mixing of all kinds of paints, enamels, varnishes, other semi-fluid substances, chemicals, and for thinning and tinting, Abbe Engineering Co., 50 Church St., New York City, have designed the new Abbe-Lenart, Change-Tank Mixer. It can be inserted into any type of container of metal, wood or ceramic ware. This permits continuous, quiet, economical operation through quick change of batches of material to be mixed, without loss of time. It is also useful for mixing batches of particularly sensitive materials which should remain in special containers or for mixtures which are difficult to fill into or remove from stationary containers. The mixing head can be cleaned with very little effort by simply lowering it into a container of water or other solvent and permitting it to operate. By slowly raising the agitator while still running, most of the liquid is whisked off.

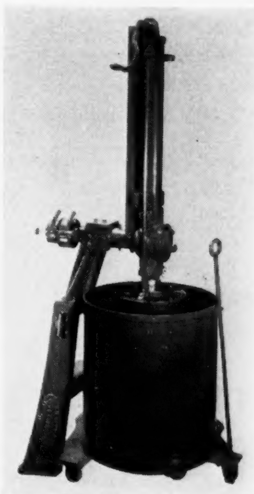


Photo-Electric Reflectometer

A new Universal model photo-electric reflectometer, known as Model M. U., is offered by Pfaltz & Bauer, 350 5th Ave., New York City. This instrument in accuracy and adaptability with other photo-electric measuring accessories is of invaluable aid in measurements of sugar, starch, pencil lead, paper, fabrics, limestone, food and cosmetic powders, etc., where determination of very minute differences in shade is of importance. The Reflectometer is primarily a novel photocell which transforms light directly into electric energy, indicated by a microammeter, which serves as the measuring instrument.

Manufacture Synthetic Urea

In the synthetic manufacture of urea by heating under pressure ammonium carbamate, obtained by reaction of gaseous carbon dioxide with liquid ammonia in the presence of an inert liquid, there is first prepared, in a closed vessel, by means of residuary gaseous carbon dioxide and ammonia, both derived from a preceding operation, ammonium carbamate in suspension in an inert liquid not miscible with water, *e.g.*, a mineral oil, and this ammonium carbamate suspension is passed under pressure, at the same time as fresh carbon dioxide and ammonia, the latter advantageously in excess, into a high-pressure urea-formation autoclave heated to 150-250° C. *Chemical Trade Journal*, Sept. 23, '38, p. 287, reporting development of this process in E. P. 488,404, states that the resulting mixture may, after reduction of the pressure, be passed to the top of a fractionating column, heated at its base, preferably working under pressures of 4-12 atmospheres, from the top of which the ammonia and carbon dioxide leave while the urea solution and inert liquid collect at its base and are separated by difference of density.

Booklets & Catalogs

How to get these booklets: Companies will be glad to supply copies free, provided "Chemical Industries" is mentioned and the request is made on company stationery. Your business title should also be given.

Aero AC 50, Brochure, data and technical aspects on American Cyanamid rubber accelerator; some combinations with which it may be used are given, and additional possibilities are suggested which should be of interest to the industry. American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York City.

Bakelite Review, January, 1939, reports latest achievements in commercial use of synthetic resinous materials. Bakelite Corp., 247 Park ave., New York City.

Bruce Every Month, January, 1939, describes company's line of preservatives, paints, and finishes for hardwood floors. E. L. Bruce Co., Memphis, Tenn.

Car Pullers, Hoists and Winches, Catalog 7738, gives specifications, dimensions and required engineering information on how to select proper car puller. Stephenson-Adamson Mfg. Co., Aurora, Ill.

Consolidated News, Winter, 1939, lists special opportunities to obtain used process equipment. Consolidated Products Co., 15 Park Row Bldg., New York City.

De Haen's Fixanal Preparations for Standard Solutions, Bulletin, these preparations are correctly weighed and standardized analytical chemicals, which when diluted according to directions produce accurate volumetric solutions ready for instant use. Accuracy certified to be within 2 parts per 1000. Special normalities are available for sugar factories, oil and fat research laboratories, wine tests, blood and urine analysis, milk tests, smelting works, laboratories and benzol tests. Pfaltz & Bauer, Empire State Bldg., New York City.

Diamond Alkali Products for the Industrial Markets, Brochure, lists products made by each division of company. Diamond Alkali Co., Pittsburgh, Pa.

Dow Pharmaceutical and Aromatic Chemicals, Brochure, spiral bound so that later data issued may replace the old sheets; gives latest available information on forty-three pharmaceutical and aromatic chemicals, which, in addition to property data, includes shipping classifications and packages; handsomely illustrated. Dow Chemical Co., Midland, Mich.

Dow Plastic Materials and Plasticizers, Brochure, spiral bound, complete information on Dow products of special interest to the manufacturer of plastics and related materials, lists chemical and physical properties, specifications, applications, shipping classifications; many illustrations lend additional interest to this unusually instructive booklet. Dow Chemical Co., Midland, Mich.

Duraplex Alkyd Resins, booklet, outlines general functions of alkyd resins in the coatings field and particularly the use of Duraplex as a coatings raw material; blue print sketches illustrate necessary equipment and some typical views from the plant at Bridesburg are shown in back of book. Resinous Products & Chemical Co., 222 West Washington Sq., Phila., Pa.

Dust, Brochure, fourth in series of "Dust Hog" mailings; on how to handcuff the dust hog with Pangborn Dust Collectors; illustrations show typical installations; of interest to the process and metal working industries. Pangborn Corp., Hagerstown, Md.

Electric Motors, Booklet No. 508E, announces completely new line of both alternating and direct current explosion-proof motors, promising a new high in dependability, convenience, long life, and safety; illustrated and described in detail. Louis Allis Co., Milwaukee, Wis.

Electromet Review, January, 1939, feature article deals with chemical transportation and the approval of the Tank Car Committee of the use of welded stainless steel for this purpose. Electro Metallurgical Co., 30 East 42d st., New York City.

Equipment for Metallic, Non-metallic and Associated Industries, Bulletin No. 161, reports latest developments in all types of production machinery applying to processes in mineral and related industries; includes information on blowers and compressors, electrical, power, pumping, transmission, and other related equipment. Mining Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Fall Ball Viscosity Meter, Bulletin 383, announces development of meter of interest to paint and varnish manufacturers, makers of coated fabrics, and all laboratories making frequent viscosity measurements; describes advantages, technical features, and gives prices. Tech Laboratories, 7 Lincoln st., Jersey City, N. J.

Film Inhibitors in Industrial Aqueous Systems, reprint of paper presented at Fall Meeting of the A. C. S. by David W. Haering; describes application and control of the chrom glucosate derivatives in detail and presents much interesting information and data on corrosion control methods in absence of oxygen control; limited supply of reprints available to chemists and engineers interested in corrosion control in water using equipment. D. W. Haering & Co., 3408 Monroe st., Chicago, Ill.

Firefax, Number 17, useful hints on fire precautions and methods of control. Pyrene Mfg. Co., Newark, N. J.

Homogeneous Linings That Hold, Bulletin, lists types of lining available for all types of chemical and process equipment; illustrations show typical applications. Homogeneous Equipment Co., Downingtown, Pa.

How to Handle It if It is Fertilizer, from raw material to finished product, Bulletin 337, illustrates uses for conveyors and power transmission machinery in the fertilizer field, and shows how thoroughly Rex products solve moving problems in fertilizer plants. Chain Belt Co., Milwaukee, Wis.

Industrial Electric Heating, Bulletin GEA-594B, illustrates, describes, and gives ratings of various types of G-E automatic temperature-control equipment used to control all types of G-E heating equipment. General Electric Co., Schenectady, N. Y.

Ink Mixer, Leaflet, stresses operating features of this new mixer for quickly and conveniently mixing inks; gives specifications. Read Machinery Co., York, Pa.

Isco News, January, 1939, buyers of chemicals and allied lines will find much helpful information in this bulletin, as well as list of products handled by company. Innis, Speiden & Co., 117 Liberty st., New York City.

Laboratory Mixer, Leaflet, on improved model adapted to easier, more effective laboratory predictions; describes construction features; gives dimensions; illustrated. Read Machinery Co., Inc., York, Pa.

Low Lift Platform Truck, Bulletin A-8416, on Type EP-10, and Bulletin A-8459, covers Type ELN-10 **High Lift Platform Truck**; illustrations show typical applications of the basic machine to the various industries by the use of correct attachments; bulletins also illustrate other types of Elwell-Parker's, viz.—fork, combination crane, apron, etc. Elwell-Parker Electric Co., Cleveland, O.

Magnetic Motor Starter, full-voltage, Bulletin GEA-2964, completely illustrated and described. General Electric Co., Schenectady, N. Y.

Metal-enclosed Switchgear, Bulletin GEA-2872, answers many questions about metal-enclosed switchgear, what types are available, and their applications; gives voltage and interrupting ratings; illustrated. General Electric Co., Schenectady, N. Y.

Micromax Condensate Purity Instruments for the Steam Plant, Catalog N-95-163, of interest to those concerned with steam generation—whether for power or process use; shows how knowledge of condensate conditions helps to effect important operating economies, and describes reliable electrical method for continuously determining variations in condensate purity; illustrations include typical applications. Leeds & Northrup Co., 4934 Stenton ave., Phila., Pa.

Motor Application Chart, Bulletin No. 515, lists 26 different types of motors and checks the proper type of motor recommended for about 50 standard applications; contains wealth of other valuable information compiled for ready reference. Advertising Dept., Louis Allis Co., Milwaukee, Wis.

NEMA Standards and Definitions, Booklet, includes suggestions for proper selection of motors, types of drives, various types of protected motors and their definitions; information regarding service factors, rated loads, torques and other important reference information that should be in the files of every man who specifies or maintains electric motors. Advertising Dept., Louis Allis Co., Milwaukee, Wis.

Neoprene Notebook, December, 1938, feature article: "Aging Cracks in Proofed Goods Destroy the Usefulness of the Products"; other useful engineering data included. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Del.

Nickel Cast Iron News, January, 1939, portrays role of nickel cast irons in the petroleum industry; other valuable data of interest to producers and users of cast iron. International Nickel Co., 67 Wall st., New York City.

Potentiometer Indicating Recording Controller, Bulletin DMF 765, fully explains mechanism and operating advantages; illustrations show how rotating contact control system has been incorporated for first time in an instrument of this type; complete description of new features; general specifications given, also a typical mounting diagram. Foxboro Co., Foxboro, Mass.

Price List, January, 1939. Mallinckrodt Chemical Works, St. Louis, Mo.

Quarterly Price List of R. & H. chemicals for all industries, January, 1939. R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.

Rex-Weld and Rex-Tube Flexible Metal Hose, Catalog G-14, illustrations and engineering data on corrugated metal hose, asbestos packed hose and other types, and coupling recommended for each type; a "New Products Section" in color, bound into center of book, discusses Stainless Steel Bellows, Avioflex—with a cellulose element which is practically resistant to all hydrocarbons; and RW-89 diesel exhaust hose. Chicago Metal Hose Corp., Maywood, Ill.

Roller Mill, Leaflet, contains information on Kent Super 5 Model. Kent Machine Works, 37 Gold st., Brooklyn, N. Y.

Roto-Louvre Dryer, Catalog No. 1711, illustrated; stresses the economical solution of materials drying or cooling problems through use of this machine—coal, ore, chemicals, foundry sand, etc., are included in the long list of materials dryer will handle efficiently. Link-Belt Co., 300 W. Pershing Road, Chicago, Ill.

Squirrel Cage Induction Motors, Bulletin No. 1195, on "Lo-Maintenance" models; several pages devoted to case studies of these motors that have been in operation under adverse conditions; also included are illustrated descriptions of construction details and a table giving common types of these motors and their application. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Super Portable Can Paste Mixer, for faster and better mixing, Brochure, fully describes added improvements incorporated in this equipment: double blade, portable tank, quick acting, labor saving. Kent Machine Works, Inc., 37 Gold st., Brooklyn, N. Y.

Surface Active Chemicals, Leaflets, describe Surfax and Surfax W. O., give factual data and charts. E. F. Houghton & Co., 240 W. Somerset st., Phila., Pa.

Technical Bulletin 10, devoted to effect of silicon on the properties of certain of the most popular chromium-molybdenum steels now being used by the refining industry; a statement on influence of copper in steel tubes intended for high-temperature service is also given. Babcock & Wilcox Co., 19 Rector st., New York City.

Tego-Bonded Construction, Booklet, descriptions of Tego resin film and Uformite liquid resins, and their uses as bonding agents in the plywood industry; exposure tests are discussed along with testing procedures, cases from practice are listed, and several pages are devoted to photographs of typical industrial adaptations. Resinous Products & Chemical Co., 222 W. Washington Sq., Phila., Pa.

The Crown, January, 1939, house organ, reports latest developments in the caps and bottle field, keeps customers informed of new branches being opened by company. Crown Cork & Seal Co., P. O. Box 1837, Balto., Md.

The Laboratory, Volume 10, No. 3, feature: "Berthelot—Chemist and Statesman"; short items discuss methods and apparatus for handling various laboratory problems. Fisher Scientific Co., Pittsburgh, Pa.

The New Jersey Zinc Activator, December, 1938, features Parts Two and Three of "White Rubber Compounding" article. New Jersey Zinc Co., 160 Front st., New York City.

The New Jersey Zinc Alloy Pot, Vol. 6, No. 4, annual automotive issue, reveals importance of zinc alloy die castings in the successful production of the '39 crop of four wheeled business boomers; prominent applications discussed and illustrated. New Jersey Zinc Co., 160 Front st., New York City.

T. P. C. Non-Pressure Safety Siphon, vacuum principle, Leaflet, describes use of this siphon for safe handling of acids; lists models available and gives prices. Homogeneous Equipment Co., Downingtown, Pa.

Witcombings, December, 1938, monthly house organ of interest to users of carbon black, containing many items on developments of new products and processes. Wishnick-Tumpeer, Inc., 295 Madison ave., New York City.

New Chemicals for Industry

A digest of products and processes

Liquid Sulfur Dioxide in Textile Bleaching

An abstract of a paper on the commercial or large scale use of a new process and its advantages over the sulfur burning process

By C. F. Ward

Chief Chemist, W. E. Saxby, Ltd.

BLEACHING wool by the fumes of burning sulfur is one of the oldest known textile processes. The general practice even now is to suspend the material on rods in a wooden shed and to expose it to the fumes of burning sulfur for some hours, until the sulfur has either gone out or burned away completely.

The process apparently is very simple and cheap, but has obvious disadvantages which have always been a source of trouble and expense. The chambers are usually opened after about six hours and the dense white fumes of sulfur dioxide and sulfur trioxide allowed to disperse as rapidly as may be in any air currents which may happen to be about. Efforts have been made to ventilate the chambers into the works chimney, sometimes with unfortunate results for the chimney.

The process is difficult to control with any degree of accuracy, and the quality of the sulfur may have much to do with the variation in the final bleach. It has been found, for example, that if the roll sulfur contains hydrogen sulfide the burning may cease prematurely, and impurities such as selenium have from time to time been held responsible for stains of doubtful character which may be formed.

Altogether the system has been a sort of Cinderella of the textile industry, and cases have been known where firms have been compelled to pay compensation to gardeners and farmers for damage done to crops. One case was reported even where the company, years ago, had to purchase a considerable area of land in order to have sufficient room to carry on the process without annoying anyone.

When we tackled the problem of sulfur bleaching of wool, the immediate problem was the purification of the atmosphere in and around the works. Certain difficulties and faults had been connected with the presence of traces of sulfuric acid in material being processed at various stages, and the process about to be described was worked out in an endeavor to eliminate the source of inconvenience, both from the works and the personal point of view. Our works are situated in a developing industrial area, and it is essential that all processes should be under strict control.

That we have been successful may be judged by the fact that a garden adjacent to the plant has been made to yield real flowers of natural hue and the grass and shrubs no longer have that jaded appearance associated with "acid atmosphere." The former expanse of resistant laurels has given place to thriving young poplars and other more delicate plants.

Wet processes, by which is meant the use of sulfite under various conditions, were ruled out for a variety of reasons which need not be gone into now. The process not being continuous, sulfur burners of various types were not likely to be a success, and we were driven to devise ways and means of using liquid sulfur dioxide on a commercial scale.

It is quite simple to take a piece of woolen yarn or fabric, put it in a jar, pass in a large quantity of sulfur dioxide from the familiar syphon, wait until the next day, and fetch out a piece of nicely-bleached material. The expansion of this process to large-scale production was a most interesting piece of work, and brought out a number of difficulties which arose out of the nature of the product used.

Liquid sulfur dioxide has a boiling point of —10.8° C., a melting point of 75.2° C., and a density at 20° C., of 1,3831. It can be purchased in cylinders containing 56 lb. or 2 cwt. of sulfur dioxide. The cylinders themselves also weigh respectively about 56 lb. and 2 cwt. The pressure inside the cylinders is about 30 lb. per sq. in., and varies slightly according to the temperature of the atmosphere. This pressure is actually less than that employed in many service steam pipes, so there is no need to venerate the cylinders merely on account of the pressure alone. They should naturally be treated with respect, and not exposed to unnecessary heat, as the pressure rises rapidly. The use of a blow-lamp to ease tight valves is not recommended.

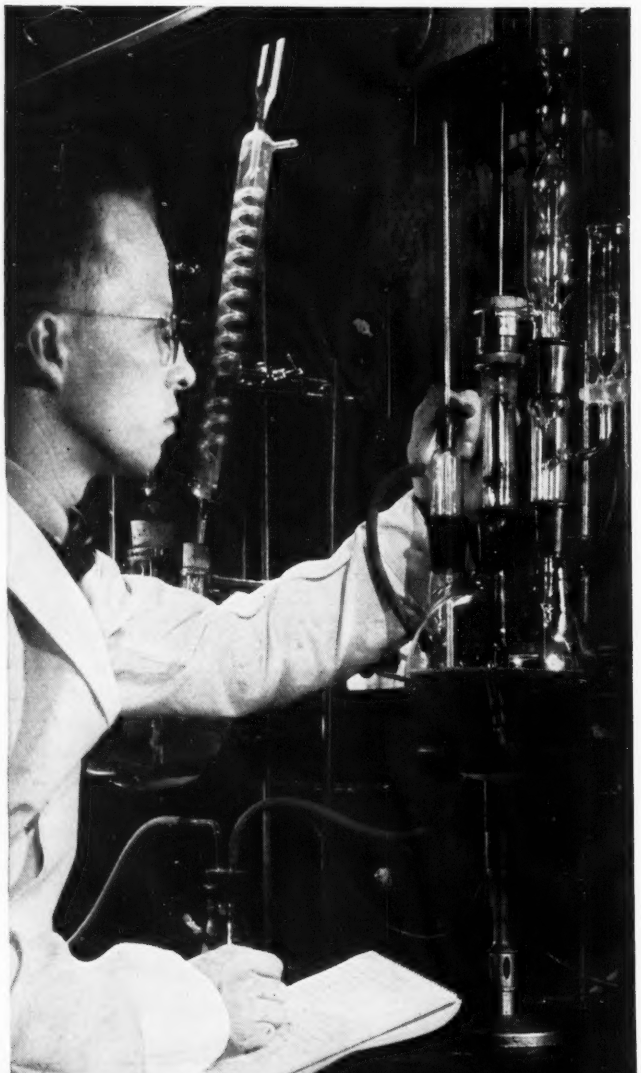
The process is quite simple in that the material to be bleached is hung in chambers so designed that a circulation of air and sulfur dioxide can be maintained, using a lead fan and a special system of duct work. The chambers are made of any resistant material, wood being quite suitable, and when quite full of fabric or yarn the doors are closed, and the calculated quantity of sulfur dioxide introduced via the duct and the lead fan. The absorption of sulfur dioxide is very rapid, and it can be fed into the system at about 1 lb. or 2 lb. a minute depending on conditions. It was here that difficulty was mainly encountered; from the cylinders the rate of discharge was slowed down very much by the cooling of the liquid sulfur dioxide. It was not a practical proposition to warm the cylinders, and it was found that if the liquid sulfur dioxide was discharged directly into the circulating air, an accumulation of a white solid was formed. This consisted of ice (from atmospheric moisture), solid SO_2, and a hydrate of sulfur dioxide which is not easily volatile. These results led to the devising of a method whereby the liquid sulfur dioxide is discharged on to a heated surface where evaporation can be easily observed and controlled. The apparatus consists of a basin of any suitable material, which is placed in the circulating duct and is heated from below by steam or any other suitable means, such as electricity.

The circulation is maintained for a few minutes after the sulfur dioxide is all run in, and the charged chambers left undisturbed for as long as is necessary or convenient. Afterwards, and this is a vital part of the process, the chambers are ventilated, and the sulfur-laden air scrubbed through a tower against a counter-current of some alkaline material. For our own purpose, we use a waste lime sludge from the water softeners suitably diluted. Thus practically pure air is discharged, and as no nuisance is caused, this represents a considerable

Paper read before the Nottingham Section of the Society of Chemical Industry, and abstracted from "The Dyer & Textile Printer," Dec. 30, '38, p. 583.

REICHHOLD

INDUSTRIAL SYNTHETICS



UP FROM OBSCURITY

The chemical world is well aware of the successes and failures in its midst.

Therefore, the rise of Reichhold from utter obscurity to world prominence, as a producer of industrial synthetics, is quite common knowledge.

We believe, however, that further illumination should be shed upon this fact.

Reichhold began with, and continues to hold, one tremendous advantage—a research and production personnel that includes some of the foremost minds in the realm of synthetic resins.

It has been the work and guidance of this staff that has brought Reichhold to its present size and scope—operating seven plants, both here and abroad.

More recently, Reichhold, itself a large user of glycerine, has entered into the production of this product and offers it to technical users.

Thus, the activities of Reichhold expand—embracing a complete line of synthetic resins, processed copals, ester gums and synthetic oils to which is now added glycerine.

REICHHOLD CHEMICALS

INCORPORATED • DETROIT, MICHIGAN

WORLD'S LARGEST PRODUCERS OF SURFACE COATING SYNTHETICS

advance on the old process alone. This point is really most important, particularly in view of the tendency of present legislation.

However attractive and startling a process may be, unless it represents a completely new result, and is not merely a new route to an old result, it must pass three tests before final judgment can be given on it. It must give at least as good results as those obtained by old processes, by which I mean that the customer must be at least as pleased with the finished product, even if it shows no improvement. The new process must satisfy the management of a business as to its cost, that is, it must not increase cost without increasing income, unless there are substantial economies which can be effected. In the present condition of trade, few people are willing to pay more money for the same result, so that we arrive at the position where cost must not be increased. Thirdly, any new process must not be a backward step as regards the operator, rather the other way. The convenience and health of the workpeople must be increasingly considered in new developments. As far as our own results go, using liquid sulfur dioxide, we claim that these conditions are all satisfied. All grades of textiles containing wool which are usual in the local bleaching and dyeing trade have been satisfactorily processed, the total output of the plant in use exceeding two million pounds.

The cost is of the same order as the old sulfur-burning plant, and against the capital cost of any alterations can be set the economies effected and the freedom from nuisance and corrosion resulting from the change over. As far as operation goes, the cylinders certainly have to be handled, but the improvement in conditions for emptying and clearing the chambers is most marked, the freedom from fumes being a great relief.

I have not touched at all on the purely scientific side of the process. Questions such as the effect of pure sulfur dioxide on the final result as against the mixed oxides of sulfur, the old controversy of wet versus dry stoving, the condition of the fabric as regards acidity or alkalinity before bleaching, all these have been investigated. Such interesting points, too, as the rate of absorption of sulfur dioxide by fabric, efficiency of the gas-scrubbing system, careful checking of the air speeds so as not to allow the operators to be working in more than a barely perceptible draught, and air temperature changes brought about by the evaporation of the liquid sulfur dioxide, are all the subject of laboratory and large-scale work.

White Suede Process

A complete process for the manufacture of fine white suede leathers has been developed by Tanners Specialty Co., Peabody, Mass.

Linseed Oil Substitute

The seeds of candlenut oil (*Aluerite moluccana*) yield 58 to 60 per cent. drying oil which is said to be a satisfactory substitute for linseed oil, according to *National Paint Bulletin*, Dec., '38, p. 9. The cold pressed oil is almost colorless after filtration, but extraction with hot petroleum ether gives a brown oil with an unpleasant odor.

Straw Newsprint

A low-cost newsprint made from Pennsylvania wheat straw will have its first tryout on newspaper presses soon, according to a recent newspaper report. The straw is treated in a "secret way" and converted into a fibre resembling a thread of cellulose of varying lengths. With further treatment it becomes pulp which can be rolled and made into sheets. The report also stated that it would be made in a Pittsburgh plant and taken to a Tarentum, Pa., paper mill.

New Paper for Offset

Improved register of color prints by the offset process has been made possible by an important advance in the making and treatment of paper, according to the Bureau of Standards. Method has been tried in commercial scale production with most satisfactory results. A paper describing it was read by C. G. Weber of the Bureau to the Delaware Section of the Technical Ass'n Pulp & Paper Industry.

New Carbon Black Process

Manufacture of carbon black by decomposition of green oil and oily tar is described in *National Paint Bulletin*, Dec., '38, p. 8. The green oil is obtained from the distillation of tar, and combined with the oily tar which is decomposed at 800° C. in an iron retort, with or without use of air. Process yields from 27.7 per cent. to 32.0 per cent. carbon black which contains 4 per cent. water and 4.0 to 4.7 per cent. volatile matter.

Compressed Gases as Insulation

Experiments with a new means of insulating power transmission lines by the use of compressed gases such as helium and nitrogen were reported by Alvin H. Howell, Massachusetts Institute Technology, at the winter session of the American Institute Electrical Engineers.

Asbestos-filled Molding Materials

Two newly formulated, asbestos-filled Durez molding materials have been made commercially available by General Plastics, North Tonawanda, N. Y. Compounds are known as Durez 38-443 and Durez 38-646. Several advancements over others of their type previously offered have been incorporated in these new materials. Durez 38-443 was formulated specifically to meet Underwriters' specifications of withstanding 200° C. for 72 hours. It also has an impact strength of .23 (ASTM) and a compressive strength of 28,000 (ASTM). Heat resistance is recorded at 490° F. Specific gravity is 1.80.

Durez 38-646 has an exceptionally low specific gravity for asbestos-filled molding compounds—1.59. It has a slightly higher heat resistance, 500° F., but a lower impact strength—.19 (ASTM). However, its Flexural Strength of 9000 (ASTM) is greater than for any previously available. Compressive strength is also 28,000 (ASTM). The addition of these two new molding compounds now establishes a very wide range of physical properties in the standard Durez asbestos-filled plastic materials—more than half a dozen types being available.

Month's New Dyes

Du Pont announces a new sulfur blue, "Sulfogene" Navy Blue GLR Concentrated. Color is recommended for dyeing cotton in all stages of manufacture, and for use in the same machines in which the GL type is employed. It presents no application difficulties since it levels well and shows good penetration and exhaustion. It is not suitable for discharging or printing.

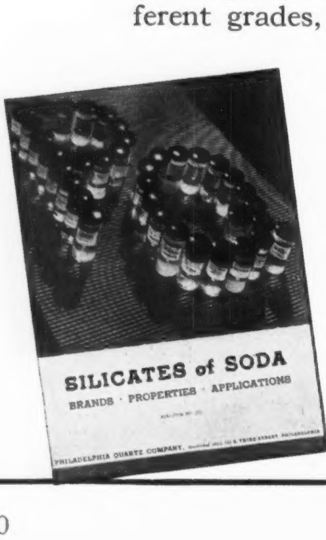
General Dyestuff latest releases include: Chrome Fast Yellow 5GD, a chrome mordant dyestuff of particular interest for color discharges on both vegetable and animal fibres. Product yields a very bright greenish yellow. Brilliant Euchrysine Orange R is described as a basic dyestuff, recommended primarily for colored discharges on pure or weighted silk, producing exceptionally bright shades, which in brightness cannot be obtained by mixtures of other basic colors, and which produces very uniform results. Fastusol Red L4BL, a homogeneous, direct dyestuff, is distinguished by its bright shade and very good fastness to light. Color is easily soluble, and stains wool and silk but slightly from a neutral bath, leaving acetate clear. Fastusol Yellow RK is a dyestuff of very good affinity even at very low temperature and without the addition of salt. It is of particular interest for dyeing spun and staple rayons and mixed fabrics of these fibres with cotton.

"Silicate?... Oh-waterglass... ...WE'VE GOT THAT!"

(BUT–IS IT THE RIGHT GRADE?)

THE NEXT TIME you are tempted to go to the corner drugstore for a can of "waterglass" for a laboratory experiment, bear this in mind. Silicate of Soda (waterglass) comes in over thirty different grades, solid, liquid, powdered. The grade for egg preserving that you buy at the drugstore is usually the commercial 40° Baume grade (ratio 1:3.25). Maybe it will work for your purpose but chances are, it is entirely unsuited. Let PQ Silicate Headquarters send you the correct silicate. No need for you to divulge any secret formula, but if information is given in confidence, it is so respected.

Our accumulated experience in adapting silicates to industry covering three-fourths of a century is at the disposal of those who use silicate or could use it.



PHILADELPHIA QUARTZ COMPANY

◄ A convenient, compact, reference bulletin on Silicates of Soda free on request. Ask for No. 171.

General Offices and Laboratory: 126 S. Third Street, Philadelphia, Pa. Chicago Sales Office: Engineering Bldg. Sold in Canada by National Silicates Ltd., Toronto, Ont. Nine plants. Distributors in over 60 cities.

There's a PQ

SILICATE OF SODA

FOR EVERY PURPOSE

Improved Gum Damar Process

A new process for purification of gum damar has been developed in the Buitenzorg chemical laboratory, according to *Chemical Trade Journal*, Dec. 23, '38, p. 590. Process, which has been patented, gives rise to hopes that the quality of the resin will be so improved that it will be able to compete very effectively with the synthetic resins.

Production Nitroparaffin

Discovery of a process by which nitroparaffin may be produced on a low-cost quantity basis, has been patented by Dr. Hass, head of the department of chemistry at Purdue University. Process, explained by Dr. Hass to the Akron section, A. C. S., recently, involves formation of the product by passing a mixture of hydrocarbons from natural gas and nitric acid gas through a heated tube, the resulting nitroparaffin being a water-like liquid. Importance of the discovery lies in the fact that 13 or 14 classes of organic compounds have been developed by using nitroparaffin. It is applicable to a wide variety of processes.

New Use for Bentonite

Possible use of bentonite as insulation in electrical devices is reported by The American Petroleum Institute, 50 W. 50th st., New York City.

Luminous Molding Powder

An interesting development by Ray Engineering Co., Waterdale Works, Southmead, Bristol, England, is the production of a luminous molding powder, known as Grade 1014. Powder is suitable for all ordinary molding purposes and can be molded as easily as ordinary normal powders. Moldings become luminous immediately after exposure to a strong source of light such as an electric lamp or daylight, and retain their luminous properties for approximately four hours over a steadily falling curve, after which time it is necessary to expose them again to a source of light for the purpose of reactivation. Numerous applications are anticipated for this material, some of which are: Switch dollies, indication buttons, figures, letters, etc. Product is reported in *British Plastics*, Jan., '39, p. 428.

Basic Aluminum Compounds

Basic aluminum compounds truly or colloidally soluble in water are obtained by dissolving aluminum in aqueous solutions of aluminum salts of mineral acids (other than sulfuric acid) containing at least 5 gms. Al_2O_3 per litre at elevated temperature, say, between 35° C. and the boiling-point of the liquid. Boiling for any length of time must be avoided, but the solutions obtained may be evaporated to dryness in vacuo to obtain water-soluble solid salts. Alternatively, aluminum may be dissolved in the mineral acid or a solution of the acid salt using such proportions that basic salts are obtained. Examples relate to the production of basic chlorides, bromides, iodides, and nitrates, and the production of basic fluorides is also referred to. Products may be used for tawing, as catalysts, for waterproofing textiles, for the preparation of adsorbents, and in the paper and pharmaceutical industries. Process is basis of E. P. 489,-769 described in *Chemical Trade Journal*, Oct. 8, '38, p. 407.

Oil Well Treating Chemical

Engineers who have been experimenting for several months with a new chemical water drive, say that it reduces fissuring in oil sands, and that pressures as high as 5,000 pounds a square inch can be used. Method is believed to be applicable in Virginia, Ohio and the Mid-Continent fields, according to American Petroleum Institute, 50 W. 50th St., New York City.

Prevention Silver Tarnish

A new approach to the problem of prevention of tarnishing by silver and silver alloys was described by Dr. L. E. Price and Dr. G. J. Thomas (both of the Goldsmiths' Metallurgy Laboratories, University of Cambridge) in a paper to the Institute of Metals at its autumn meeting in London.

Although previous investigators have shown that oxide films may retard tarnishing, hitherto it has not been possible to explain why some oxides have a particularly high protective effect against oxidation or tarnishing. A theory has now been developed by Price and Thomas which shows the factors involved in tarnish-resistance. This theory has explained many previous results, and has indicated that other alloys (*e.g.*, those containing aluminum) which have not previously been found to be tarnish-resistant, become tarnish-resistant when the alloy is heated under such conditions that only the aluminum is oxidized, giving rise to an invisible film of pure alumina. Tarnish-resistant films cannot be formed by heating these alloys in air, owing to the fact that both the silver and its alloy constituents oxidize simultaneously. Optimum results can only be expected with pure films of such oxides as alumina or beryllia when free from silver oxide.

Two methods have been developed for the formation of such films of pure alumina or beryllia: (1) Selective oxidation of aluminum or beryllium in silver alloys by heating in hydrogen containing 0.1 mm. partial pressure of water vapor, to give a film of pure alumina or beryllia; and (2) superimposing transparent, cathodically-deposited films of these oxides on pure silver and its alloys. Such oxide films are found to be highly protective against tarnishing. Method is reported in *Chemical Trade Journal*, Nov. 11, '38, p. 440.

New Application of Polystyrene

A new use for polystyrene is in conjunction with a scientific device for the elimination of the dazzle rays in motor-car headlamps, and is reported in detail in *British Plastics*, Jan., '39, p. 426.

Rubber Powder

A type of rubber powder, which lends itself to new uses of rubber rather than to use in present rubber manufacturing processes, has been commercially developed by technicians of the Proefstation, West Java, Buitenzorg, Java, Netherlands, East Indies. "Mealorub," as it is called, is described as a real rubber powder containing approximately 96 per cent. rubber, and possessing many remarkable properties. Its production consists of flocculating field latex with acid, removing the flocculate from the serum by centrifuging, and then washing and drying it. Although only a small pilot plant is now being used at the Station for the production of this powder, it is claimed that the chemical and physical properties can be guaranteed within very narrow limits in large scale production efforts due to the washing process in the centrifuge and to the easy manner in which different lots of the powder can be mixed. Process, properties, and applications are described in detail in *Rubber Age*, Jan., '39, p. 216.

Foreign Plastics Development

A heat and cold insulating material, consisting of about 90 per cent. volume of microscopically small cells in which air is enclosed, trade named "Iporka," is being produced by the I. G., Frankfort-am-Main, Germany. Its low specific gravity of about 15 kg. per m^2 is said to make it the lowest-weight insulating material available at present. Heat conductivity at 20° C. is only 0.027. It is manufactured in sheets and slabs of various sizes and thicknesses, also in tubes and bars. For stuffing purposes it is supplied in the shape of flock. Material is non-inflammable, and does not smoulder. A flame is not conducted farther even when the material has come into direct contact with it. Only those parts immediately burnt by the flame are charred.

Chemical Specialties for Industry

A digest of new uses and new compounds

Dr. Charles F. Mason Discusses

Formulation of Rust Removers and Inhibitors

THE word rust in this article is restricted to that of the metal iron, the corrosive deposit which is always a source of trouble in laundries, hot and cold water systems, oil fields, factories and wherever an unprotected iron surface is exposed to a humid atmosphere. The word is used synonymously to mean a discoloration of fruits and grains by parasitic fungi, and also implies the corrosive deposits found under humid conditions upon all metals except the rarer ones like platinum, gold, and silver.

However, in that iron and its alloys still comprise the major portion of our structural and conveying mechanisms and that its oxides possess a distinctly red color in contrast to the white ones of zinc, aluminum and tin, the removers and inhibitors have been chosen to offset iron rust exclusively. The mechanism of the rusting process has been a controversial subject for scientists since iron was first used by our ancestors, and after many theories were formulated and tested, three principles stand out today, upon which all agree.

These are that

1. Rusting will not proceed at ordinary temperatures in the absence of moisture.
2. The presence of more active metals like zinc, tin or lead in contact with iron and moisture accelerates rusting by electrolytic action.
3. The chemical and physical properties of rust vary widely, with age and conditions. Twenty-three samples varied in moisture content from two to twenty-two, in ferric oxide content from four to twenty, and in ferrous oxide content from one to three.

This does not take into consideration rust from some industrial districts like oil fields, refineries, illuminating gas and acid plants, where rust would invariably contain besides those already mentioned, sulfides and sulfates.

Mill scale, the black deposit upon freshly rolled steel rods, wire and sheets is given this title, because it has been formed at an extremely high temperature and although an oxide, which must subsequently be removed, it is not rust in the true sense of the term. Rust removers and inhibitors must not only be formulated to remove and prevent to some extent the formation of these compounds, but they must not damage the object to which the rust is adhering.

One instance is the red deposit found upon textiles after the washing and ironing process, where highly alkaline soaps, combined with the oxidizing action of the bleach, result in precipitation of red ferric oxide in the fabric. The methods of removal for all objects can be classified under four general headings.

1. Manual (by brushing and scraping)
2. Mechanical (by motor operated brushes)
3. Chemical (solution, or lubrication)
4. Sand blasting (sand carried by an air current or by rubbing in a pebble mill)

Only the chemical methods are to be discussed here, and they are limited in their scope only by the size of the object because immersion is usually necessary. They cannot be applied to the bottoms of ocean going liners, suspension bridges and other exposed structures.

Rust removers, Solution type (from metal)

1.	Phosphoric acid	35
	Alcohol	10
	Kieselguhr	45
	Tannin Extract	10

This is a paste, which can be spread, allowed to dry and be scraped off.

2.	Oxalic acid	20
	Phosphoric acid	20
	Glycerol	10
	Ground silica	50

This is a paste for placing in inaccessible engraved surfaces and after allowing to stand in a warm place for fifteen to twenty minutes can be washed off.

3.	Phosphoric acid	35
	Sulfonated oil	10
	Water	55
4.	Acetic acid	30
	Water	60
	Phenol	10
5.	Linseed oil	17
	Alcohol	40
	Hydrochloric acid	34
	Acetic acid	9

Numbers three, four and five are for immersion of objects.

Rust removers, Lubricating type (from metals)

1.	Xylene	55
	Rosin soap	11
	Paraffin oil	34
2.	Kerosene	50
	Castor oil	10
	Trichlorethylene	30
	Triethanolamine	10

These and similar formulations are sold for loosening rusted parts of machines and are improvements over the use of kerosene which has been the common solvent in these instances for some time.

Rust removers, Solution type (from textiles)

1.	Hydrofluoric acid	7
	Borax	4
	Water	89
2.	Oxalic acid	5
	Acetic acid	4
	Water	91
3.	Water	90
	Ammonium acid fluoride	5
	Ammonium citrate	5
4.	Water	92
	Potassium hydrogen fluoride	3
	Oxalic acid	5
5.	Titanous sulfate	3
	Sulfuric acid	3
	Water	94

The textile should be immersed in any one of these solutions and after allowing time for all parts to become soaked thoroughly, it is rinsed and washed with water to which a small

quantity of ammonia has been added. Hydrofluoric acid should be handled only by experienced people, when taking it from the original container. Even the vapors will damage the teeth.

In the first group of formulae, it is to be noted that a high concentration of acid is present for the purpose of dissolving the rust or, in other words, to bring it into solution. One would logically expect, that after solution of the surface oxides, solution of the metal would follow, resulting in an uneven etched surface. This is indeed the case if the acid is left in contact over too long a time interval and if an inhibitor is absent. In each of these formulae an organic substance is present to prevent the solution of the metal and experiments have shown their effectiveness.

Before discussing inhibitors it is well to make a distinction between them and another class of compounds, which in the trade are termed inhibitors but are in fact de-aerators or deactivators. In steam generating boilers rusting continues inside as long as any oxygen is present. An appreciable amount of dissolved oxygen is present in all, but recently distilled water and boiler waters are either treated previously to remove this, or compounds are added to absorb this oxygen. These are not to be confused with another class about to be described.

Since the discovery of inhibition in acid solution, there has been much activity in this field both in granting of patents and attempts to determine which were most effective. Some are listed below.

1. Starch, peptized
2. Furfuryl alcohol with molasses and manganese borate
3. Sugar cane refuse with metallic phosphates like manganese and copper
4. Ketones
5. Amyl and ethyl acetates
6. Sulfonated products of anthracene
7. Naphthalene sulfonic acids and formaldehyde
8. Metal glycero-phosphates of iron and cadmium
9. Sulfonated vegetable oils
10. Soap (waste sulfite liquor)
11. Sodium alginate
12. Sugar

These and others, present in amounts varying from 0.01 per cent. to 1 per cent. in 34 per cent. solutions of hydrochloric, sulfuric or phosphoric acid prevent solution of the metal but not the rust. Others use salts of poisonous metals like arsenic, lead, barium and in one case a metallic cyanide was recommended. However, these are out of the question for removing rust deposits from cold drinking water systems.

Recent investigations have placed the following as the most effective.

1. Quinoline Eth-iodide
2. Coal tar extract
3. Quinoline
4. Oil refinery sulfonated sludge

The first three are expensive even in one per cent. solution which leaves number 4 and a much similar material from slaughter houses as outstanding inhibitors in low concentration. Some prefer to use less expensive materials in higher concentrations as in the formulae listed above. An example of a rust remover saving the enormous expense of installing new piping systems in office buildings and apartment houses is one of many applications of these compounds.

Textile Detergent

Sulfanole PB, a completely new detergent, is described as a synthetic soap suitable for use in scouring, boiling off, or dyeing of piece goods, raw stock or hosiery—cotton, wool, silk or rayon. Only small amounts are required and no assistants are necessary. It is not affected in any way by acid or alkaline baths, metallic salts, etc., and also possesses exceptional rinsing speed. Manufacturer is Warwick Chemical Co., West Warwick, R. I.

Defoaming Agent for Paper

A special grade of capryl alcohol, trade-marked Diafoam, has been announced by Resinous Products & Chemical Co., 222 W. Washington Sq., Phila., Pa., for use as a defoaming agent in the manufacture and coating of paper. Product is suggested for use in beaters, in stock lines, in head boxes of paper machines, and in color boxes of paper coating machines. Claims made for Diafoam include the following: more effective than commonly used foam deterrents; no fisheyes result from its use; leaves no residual odor in final stock; and gives smoother colors.

New Specialized Coatings

Two new paints—one to prevent the "spatter" from an electric welding arc from sticking to metal surfaces, and the other a new enamel which dries with a dull finish—have been developed by Mahoning Paint & Oil Co., Youngstown, O.

New Leavening Agent

An important contribution to the baking industry is a new type of leavening agent, known as V-90, recently introduced by Victor Chemical Works, Chicago. New product differs radically from ordinary phosphate in that it reacts much more slowly with soda and thus "delays" leavening action until the dough is placed in the oven. A slow-acting monocalcium phosphate fills a need of long standing because the old type phosphate, while an excellent baking acid, was handicapped, nevertheless, by too rapid an action in the presence of liquid. Advantage of the new product is that prepared flours containing V-90 produce strikingly superior results. Biscuits, for example, have a definitely whiter crumb color, an increase of from 30 per cent. to 40 per cent. in volume or biscuit height, a softer, more silky interior, and a noticeable improvement in lightness and palatability. Even in cake baking, prepared flours containing V-90 are far superior. Patent self rising flour made with this new phosphate is claimed to be particularly suited for all oven products such as cakes, muffins, waffles, etc., thus opening up new and real possibilities.

Leveling Agents for Oil Enamels

Long oil enamels frequently suffer from poor brushing and leveling properties which limit them in their application and prevent formation of a film of satisfactory smoothness and gloss. *Paint, Oil & Chemical Review*, Jan. 19, '39, p. 20, states that the suggestion has been made to add such agents as benzoic or crotonic acids. Experience with such compounds has shown that the hydroxyl group seems to be especially active as a wetting medium and aid in the dispersion of the pigment. Unsaturated aliphatic acids have previously been proposed as leveling agents, but it was found that relatively large quantities of these acids would have to be added in order to obtain the desired effect.

In Austrian Patent 151,285, it is proposed to use small quantities of unsaturated carboxylic acids derived from acetylene and containing a triple linkage of the type found in acetylene. In these compounds the one hydrogen contained in acetylene is substituted by a carboxylic group or a compound containing a free carboxylic group while the other hydrogen compound may be substituted by an aliphatic or an aromatic radical.

The use of compounds of this type makes it possible to obtain perfect leveling enamels with the addition of as little as 0.2 to 0.4 per cent. of the agent, based on the weight of the finished enamel. In unpigmented finishes the addition of these agents results in the formation of a smooth film free of wrinkles. In pigmented products they are adsorbed on the pigment surface and aid in obtaining and maintaining a perfect dispersion of the pigment. The agent is preferably added before grinding the pigment in the vehicle. Mixtures of agents may also be used to advantage.

New Wax Size

A wax size, called Nopco Base Oil 1765, has been announced by National Oil Products Co., Harrison, N. J. Manufacturer suggests its use with rosin as an improved beater size, with starch for tub sizing, in water boxes on calendar stacks, for blending with coating agents, and for the sizing of paper on the alkaline side. Among the advantages cited for it are: improved finish and flexibility, increased sizing without increased brittleness, improved printing qualities due to improved finish, greatly improved quality feel, non-curl or buckle, and use of direct dyes in connection with alkaline sizing.

Insulating, Fireproofing Medium

"Marinite," a fireproof panel material used in modern ship construction, will be made available for use as an insulating material and for fireproofing structural steel in oil refineries and chemical plants, according to an announcement by Johns-Manville, 22 E. 40 St., New York City.

Solvents for Cellulose

That the oxides of the tertiary amines possess excellent solvent properties for cellulose has been revealed in French Patent 820,556 issued to Society of Chemical Industry in Basle. In one example mentioned in this specification, 7 parts cotton linters are treated with 93 parts trimethylamine oxide and mixed carefully while heating to 50—70° C. The linters dissolve, giving a very viscous solution, from which the cellulose can be regenerated by dilution with water. The oxides of dimethylcyclohexylamine and of pyridine are also referred to in the specification, according to *Chemical Trade Journal*, Jan. 6, '39, p. 14.

Drying Oil Substitute

A new drying oil substitute can be made as follows: Dehydrated lime (5 to 7 per cent.) is introduced into any acid oil, having an acid value between 100 and 120; heated to 150 to 160°, and the temperature later raised to 200°, at which time 5 per cent. manganese resinate is added. Mixture is then cooled, and the required amount of solvent added to produce the optimum viscosity. Resultant product is satisfactory for use in interior paints, but not very good for exterior paints which are exposed to weather influences. (*National Paint Bulletin*, Dec., '38, p. 9).

"Hard Paper" for Monumental Work

"Hard Paper," a new laminated plastic of German origin, has been developed to replace stone, iron and bronze for monumental works of art. Alexander Ball, German correspondent of *British Plastics*, describes it in their Jan., '39, issue, as: paper combined with a synthetic resin and pressed at a high temperature to solid blocks of the same hardness as box-tree wood and of more weight than any of the commercially used woods. It is said to resist climatic conditions, acids and heat, and can be worked with hammer and chisel.

Galvanized Coatings for Malleable Iron

No. 20 Flux for depositing smooth, hot galvanized coatings on malleable iron has been patented by Hanson-Van Winkle-Munning Co., Matawan, N. J. It is a form of zinc-ammonium-chloride which is recommended both as a flux wash and, in crystal form, to make fusions on molten zinc.

Crankcase Anti-freeze

It is reported that Gunk Compound MF (Motor Fizik), product of Curran Corp., Malden, Mass., has been adapted to use as a pour point depressor for engine oil, and also that it is an excellent crankcase anti-freeze.

Soluble Silicate Cements

Water-glass cements having an increased impermeability to liquids are obtained by use of a solution in which the proportion of $SiO_2:H_2O$ is greater than 1:2.5, and $SiO_2:NaO_2$ is smaller than 3.0:1. Preferably the amount of water is 1.5—2.0 to 1 of silica. The substance reacting with the water glass is preferably one forming a sparingly soluble compound, sodium, calcium, and barium silicofluorides being specified. Described in E. P. 488,992 appearing in *Chemical Trade Journal*, Oct. 14, '38, p. 359.

Enzyme Treatment before Wet Cleaning

An enzymic bath, using "R. S. R." solution as a digester, before wet cleaning, is recommended in order to avoid the difficult spots and stains of an albuminous type which are set and hardened in the drying process and which therefore require much more digester material and a much longer time to remove after the drying process is completed. Wallerstein Co., 170 Madison Ave., New York City, is the manufacturer of the solution.

Metal Cleaners

Rust and other oxide coatings can be removed from metal surfaces, by treatment with a water-soluble amino-carboxylic acid containing one or more basic nitrogen atoms which or each of which is bound to at least two organic residues, each containing a carboxyl group in the alpha-position to the N atom, or with a water-soluble salt of such an acid. Amino acids specified include nitrilo-triacetic acid, ethylene bis-(imino-diacetic) acid, anthranilic acid, N-di-acetic acid. These are preferably used in alkaline solution, and polishing powders or agents having abrasive action, salts, emulsifying agents and solvents may be added. In the removal of rust, reducing agents such as sodium sulfide, sodium hyposulfite or grape sugar may be added. In examples, (1) copper plates are cleaned by treating with a mixture of kieselguhr, dextrine and sodium nitrilo-tri-acetate; (2) rusty tin plates are immersed in a boiling solution containing sodium nitrilo-triacetate to which grape sugar or sodium hyposulfite is added preferably in small amounts; (3) a mixture, prepared by emulsifying oleic acid with a solution of sodium nitrilo-triacetate containing ammonia, and adding alcohol, sangaj oil, ammonia, and kieselguhr, is spread over a rusty plate by brushing and rubbing, whereby the rust is removed. Subject of E. P. 492,526 mentioned in *Chemical Trade Journal*, Jan. 6, '39, p. 20.

Woodflour as Filler in Rubber Flooring

A formula for use of woodflour as a filler in light-weight rubber flooring has been worked out by W. S. Dahl, 22 Stanley Road, London, S.W. 14, England, in conjunction with the Rubber Research Department of Imperial Chemical Industries, Ltd., according to *Rubber Age*, Jan., '39, p. 210. Several patterns of light, dark and mottled colors have been successfully made with this formula, which follows:

Crepe rubber	100	Woodflour*	160
China clay	30	Whiting	50
Lithopone	30	Zinc oxide	10
Paraffin wax	2	Stearic acid	2
Sulfur	2.5	Vulcatex blue (B.S.)	4
Nonox N.S.	1	Vulcafor F	1

Cure: 20 to 30 minutes at 141° C.

*White Softwood Fir, 200 mesh

Experiments indicated that the white softwood fir of 200 mesh, which is fibrous and very white, is suitable for use in rubber flooring, and it is sufficiently fine to obviate the need for dyeing before use. Furthermore, it is not necessary to use fugitive colors. The woodflour does not cause darkening during vulcanization at 141° C., and higher temperatures might be used with safety.

RAINSOFT
398,065
Hubbellite
398,491
GORILLA Brand
402,836
WHITE RIT
403,785
Blue Ribbon
404,762
KSS
406,757

BLACK BEAR
BLACK BEAR COMPANY INC. LONG ISLAND CITY N.Y.
406,576
FIXODINE
407,255
ELECTRENE
407,452
HI-AID
408,058
XcM
408,832
"RUBBERLINE"
409,293
P&S
409,489

CRISTALBA
409,443
NITROKA
409,497
MARVOFECTANT CLEANER
THE CLEANER THAT DISINFECTS
409,754
Snowtex
410,240
STANEAWAY
410,344
IVANITE
410,395
IVANITE
PREFIX
410,396
INTERNATIONAL CHEMICALS
QUALITY SERVICE
I L C
AROUND THE WORLD
410,398

PING
410,443
GRUB-O
410,567
MULSENE
410,944
R CHEMICALS
410,978
PLANTENE
411,027
ACTIGEL
411,045
411,216

BKC
WORLD WIDE DISTRIBUTION
411,182
KOIL-EX
411,244
PROKRAFT
411,433
AFCASENE
411,590
AFCO
411,591
HERCULOID
411,604
HERCULES
2400
411,605
411,656 RIT

411,469. Shell Chemical Co., San Francisco, Calif.; Oct. 10, '38; lacquer thinner-solvent, paint thinner and solvent; use since Sept. 20, '38.

411,484. American Anode, Inc., Wilmington, Del., and Akron, O.; Oct. 11, '38; sheet material made from aqueous dispersions of natural and/or artificial rubber and paraffin; use since Sept. 12, '38.

411,489. Calgon, Inc., Pittsburgh, Pa.; Oct. 11, '38; compound for preventing precipitation of calcium and magnesium carbonate as adherent scale in pipe lines and filter beds through which hard waters are passed; use since Aug. 9, '38.

411,492. Fisher Scientific Co., Pittsburgh, Pa.; Oct. 11, '38; ink for writing on glass and other non-absorptive surfaces; use since Oct. 3, '38.

411,535. Lowe Bros. Co., Dayton, O.; Oct. 12, '38; paints and paint products; use since Sept. 6, '38.

411,582. Minnesota Chemical Co., St. Paul, Minn.; Oct. 13, '38; washing powders for creameries and dairies, for washing utensils and cleaning purposes; use since Aug. 25, '38.

411,583. Minnesota Chemical Co., St. Paul, Minn.; Oct. 13, '38; detergents and soap builders for laundry purposes; use since Aug. 13, '38.

398,065. Sears, Roebuck & Co., Chicago, Ill.; Oct. 2, '37; water softener, including water permeable container; use since June 1, '36.

398,491. H. H. Robertson Co., Pittsburgh, Pa.; Oct. 14, '37; building cement; use since Oct. 13, '36.

402,836. Wm. John Zink, Downey, Calif.; Feb. 7, '38; gasoline; use since Jan. 20, '38.

403,785. Rit Products Corp., Chicago, Ill.; Mar. 7, '38; bleaching compositions; use since Apr. 1, '24.

404,762. International Metal Polish Co., Indianapolis, Ind.; Apr. 1, '38; chromium polish, stove polish, glass cleaning solutions or cleaners, and similar other industrial specialties; earliest use since February, 1910.

406,757. Gesellschaft fur Pokelsalze Inh. M. H. Carl Seifert, Berlin-Weissensee, Germany, May 26, '38; pickling salts; use since Feb. 9, '38.

406,576. Black Bear Co., Long Island City, N. Y.; May 21, '38; lubricating oils, greases, fats and waxes; also rubber and metal lubricants having oil and water bases; use since 1889.

407,255. American Chemical Paint Co., Ambler, Pa.; June 9, '38; compositions for treating metal, useful in preparing metals to receive protective coatings; use since May 26, '38.

407,452. Rudolph F. Willey (RoC Chemical Concern and Electrene Products Co.), Council Bluffs, Iowa; July 13, '38; cleaning compound for household and laundry use, having water softening properties; use since Aug. 1, '34.

408,058. Wm. F. Huebner (Hiaid Products Co.), Milwaukee, Wis.; June 30, '38; disinfectant, chemical soapless washing fluid, water softener, bleach, deodorant, germicide, bluing, moth crystals; use since June 1, '38.

408,832. Commonwealth Engineering Corp., Dayton, O.; July 23, '38; lacquers, paints, paint enamels, and varnishes; use since Feb. 8, '38.

409,293. Wallace V. Callender (Retinning Mfg. Co.), Chicago, Ill.; Aug. 6, '38; acid and alkali resisting compound; use since Jan. 2, '25.

409,489. Pierce & Stevens, Buffalo, N. Y.; Aug. 11, '38; compounds containing cellulose derivatives, and thinners, softeners, plasticizers, and solvents for compounds or mixtures containing cellulose derivatives; use since Nov. 20, '34.

409,443. Societe D'Electrochimie D'Electrometallurgie et des Acieries Electriques D'Ugine, Paris, France; Aug. 10, '38; aluminous abrasives; use since Apr. 13, '33.

409,497. Jacques Wolf & Co., Clifton, N. J.; Aug. 11, '38; compound for printing, impregnating and coating textiles; use since Oct. 8, '37.

409,754. Jones Mfg. Co., Richmond, Va.; Aug. 18, '38; cleaning compound for woodwork, painted surfaces, etc.; use since June 27, '38.

410,240. Snowtex Chemical Co., Melrose, Mass.; Sept. 2, '38; laundry bleach; use since Aug. 19, '38.

410,344. Thos. Fuller Torrey, Lynchburg, Va.; Sept. 7, '38; spot remover; use since Aug. 26, '38.

410,395. Ivano, Inc., Chicago, Ill.; Sept. 9, '38; paste for cleaning, preserving, and beautifying automobiles and other coated and finished surfaces; use since July 14, '38.

410,396. Ivano, Inc., Chicago, Ill.; Sept. 9, '38; paste and liquid preparation for cleaning, preserving, and beautifying automobiles and other coated and finished surfaces; use since July 14, '38.

410,398. International Lubricant Corp., Southport, La.; Sept. 9, '38; aluminum stearate compounds; use since May 31, '38.

410,443. Patterson O. Stewart (Electro Products Co.), New York City; Sept. 10, '38; carbon binder solvent and carbon remover; use since Aug. 31, '38.

410,567. Andrew Wilson, Inc., Springfield, N. J.; Sept. 14, '38; grub-proofing preparation for lawns, golf greens, etc.; use since March, 1929.

410,944. American Polytect Corp., New York City; Sept. 24, '38; paints; use since May, 1938.

410,978. Reichhold Chemicals, Inc., Detroit, Mich.; Sept. 15, '38; synthetic resin for paints, etc.; use since July, 1938.

411,027. Carleton Ellis, Montclair, N. J.; Sept. 27, '38; fertilizer; use since Sept. 13, '38.

411,045. Acticarbone Corp., New York City; Sept. 28, '38; desiccating compound in granular form for removal of moisture from air or gases; use since Oct. 28, '37.

411,216. Diamond Alkali Co., Pittsburgh, Pa., Oct. 3, '38; carbon tetrachloride; use since Aug. 1, '37.

411,182. Reichhold Chemicals, Inc., Detroit, and Ferndale Sta., Detroit, Mich.; Oct. 1, '38; processed and synthetic oils; use since Sept. 16, '37.

411,244. Protectol Co., Chicago, Ill.; Oct. 3, '38; detergent, germicidal cleaning compound for beer dispensing apparatus; use since Sept. 21, '38.

411,433. Elliott Paint & Varnish Co., Oct. 6, '38; paints, paint enamels, and varnishes; use since Jan., '35.

411,590. American Fibre Corp., Troy, N. Y.; Oct. 14, '38; rayon staple fibre; use since Oct. 1, '38.

411,591. American Fibre Corp., Troy, N. Y.; Oct. 14, '38; rayon staple fibre; use since Oct. 1, '38.

411,604. Hercules Powder Co., Wilmington, Del.; Oct. 14, '38; uncolloided nitrocellulose; use since Aug. 22, '21.

411,605. Hercules Powder Co., Wilmington, Del.; Oct. 14, '38; smokeless powder; use since Aug. 4, '32.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazette*, Dec. 13 to Jan. 10, inclusive.

SCRAM
411,627
VAPORATE
411,664
FLOREVIVO
411,666
GREASOLV
THE IDEAL CLEANER for BALL & ROLLER BEARINGS
411,667
Say HURA
411,698
PEP-GRO
411,716
WHITE FLASH
411,763
MICRONOX
411,745
NULLAPON
411,775
VULTRAMINE
411,776
PHENOGLU
411,786

WHITE FLASH
411,764
PLISULATE
411,792
C. S. CO.
411,824
HORMO FERT Root Power
411,845
HORMO HUMUS Root Power
411,846
LUCKY • WHITE •
411,875
FOUR SEASONS
412,118

SAVADAY
411,851
Geo. S. Tuttle
411,915
JAPELLENT
411,987
AGF
412,010
DART
412,016
TEXTAC
412,031
COPOX
412,130
ESCOLIN
412,174

Philip J. Onkay
412,112
412,140
COPAR
412,132
MYSTICOTE
412,175
CHEMISEAL
412,219
Lignum PEG
412,227
Essolite
412,234
Lignum SHOT
412,262
FYTER
412,269
FARMRITE
NITROCIDE
412,437

OYEZ
412,303
"Lectung"
412,330
ZELAN
412,364
ARLEX
412,404
GENICIDE
412,447
Tannerize
412,528
"Sani-Age"
412,612
MAGICOL
412,633
AQUA-SAN
412,651
Ureor
412,832

411,656. Rit Products Corp., Chicago, Ill.; Oct. 15, '38; dyes combined with wetting agents; use since Dec. 1, 1916.

411,627. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; Oct. 15, '38; dog repellents; use since Oct. 7, '38.

411,664. Vaporate Co., New York City; Oct. 15, '38; chemicals for treating films; use since Oct. 5, '38.

411,666. Yamanaka & Co., New York City; Oct. 15, '38; compound for prolonging freshness and life of cut flowers, plants, or branches; use since Sept. 1, '38.

411,667. Geo. Koppenhoefer (Sanesco Co.), Phila., Pa.; Oct. 15, '38; product for cleaning and removing caked, gummed, or oxidized grease from ball and roller bearings; use since Jan., '37.

411,698. Granville Lyon (Sahuara Chemical Co.), Downey, Calif.; Oct. 17, '38; soaps and soap preparations; use since Feb. 1, '38.

411,716. Soil Conservation & Chemical Co., Denver, Colo.; Oct. 17, '38; commercial fertilizers; use since Jan. 1, '38.

411,763. Atlantic Refining Co., Phila., Pa.; Oct. 19, '38; paints; use since Sept. 19, '38.

411,745. Mathieson Alkali Works, New York City; Oct. 18, '38; bactericide, germicide, deodorant, insecticide, and fungicide; use since Oct. 3, '38.

411,775. General Dyestuff Corp., New York City; Oct. 19, '38; water-softening chemicals; use since Sept. 29, '38.

411,776. General Dyestuff Corp., New York City; Oct. 19, '38; chemicals for accelerating rubber vulcanization; use since Aug. 3, '38.

411,786. I. F. Laucks, Inc., Seattle, Wash.; Oct. 19, '38; glue; use since Oct. 7, '38.

411,764. Atlantic Refining Co., Phila., Pa.; Oct. 19, '38; paints; use since Sept. 19, '38.

411,792. Plibrico Jointless Firebrick Co., Chicago, Ill.; Oct. 19, '38; plastic heat insulating material; use since July 14, '38.

411,824. Continental Supply Co., Dallas, Tex.; Oct. 20, '38; paint in ready mixed form with exception of aluminum paint which is in dry form, and pipe line coating; use since July, 1932.

411,845. H. Weil & Bros. (Weil's Fertilizer Works), Goldsboro, N. C.; Oct. 20, '38; fertilizer; use since Oct. 3, '38.

411,846. H. Weil & Bros. (Weil's Fertilizer Works), Goldsboro, N. C.; Oct. 20, '38; fertilizer; use since Oct. 3, '38.

411,875. Lucky Chemical Lab., Kearny, N. J.; Oct. 21, '38; shoe cleaner; use since Aug. 4, '38.

412,118. Tide Water Associated Oil Co., New York City; Oct. 27, '38; gasoline, lubricating oils and greases; use since Sept. 8, '38.

411,851. Vincent B. Bartos (Barton Chemical Co.), Chicago, Ill.; Oct. 21, '38; solution for bleaching, deodorizing, and disinfecting clothes, and for other household uses; use since Apr. 7, '37.

411,915. Rosa E. Tuttle, Newark, N. J.; Oct. 21, '38; mercury triple distilled from scrap amalgam; use since Jan. 1, 1900.

411,987. Doggett-Pfeil Co., Springfield, N. J.; Oct. 24, '38; insecticides for horticultural use; use since July 26, '37.

412,010. Soluol Corp., Providence, R. I.; Oct. 24, '38; compounds for treating textile fibres and fabrics for preventing or insulating against fading of colors or dyestuffs; use since June 1, '38.

412,016. S. H. Kress & Co., New York City; Oct. 27, '38; plastic wood; use since January, 1934.

412,031. Hercules Powder Co., Wilmington, Del.; Oct. 25, '38; textile sizing material; use since Apr. 14, '38.

412,130. General Chemical Co., New York City; Oct. 28, '38; fungicides; use since Sept. 15, '38.

412,174. Cowles Detergent Co., Cleveland, O.; Oct. 29, '38; alkaline detergent for use with or without use of soap; use since Oct. 1, '38.

412,112. Oriental Rouge Co., Bridgeport, Conn.; Oct. 27, '38; polishing compound for metals and glass; use since Oct. 18, '38.

412,140. Hercules Powder Co., Wilmington, Del.; Oct. 28, '38; wide variety of industrial specialties; use since Nov. 17, '36.

412,132. General Chemical Co., New York City; Oct. 28, '38; insecticides and fungicides; use since Sept. 15, '38.

412,175. Donovan Paint & Lacquer Co.; Rochester, N. Y.; Oct. 29, '38; coating for shingles; use since Dec. 22, '28.

412,219. Chemiseal Co., Detroit, Mich., Oct. 31, '38; wood preservative and sealer; use since Feb. 7, '36.

412,227. Lignum Chemical Works, New York City; Oct. 31, '38; granulated and processed wood used in cleaning and polishing plastics, metal ware, and furs; use since Sept. 18, '36.

412,234. Standard Oil Co. of N. J., Wilmington, Del.; Oct. 31, '38; fuel for pyrophoric lighters; use since Oct. 17, '38.

412,262. Lignum Chemical Works, New York City; Nov. 1, '38; granulated and processed wood used in cleaning and polishing plastics, metal ware, and furs; use since Sept. 18, '36.

412,269. Selig Co., Atlanta, Ga.; Nov. 1, '38; insecticides; use June 18, '35.

412,437. Central Chemical Corp. of Md., Hagerstown, Md.; Nov. 7, '38; insecticides and fungicides; use since Jan. 20, '38.

412,303. Oyez Chemical Co., New York City; Nov. 2, '38; wall paper remover and cleaner; use since Sept. 8, '38.

412,330. H. B. Davis Co., Balto., Md.; Nov. 3, '38; paints, enamels, etc.; use since Oct. 27, '38.

412,364. E. I. du Pont de Nemours & Co., Wilmington, Del.; Nov. 3, '38; textile finish with water repellent characteristics; use since Oct. 20, '38.

412,404. Atlas Powder Co., Wilmington, Del.; Nov. 5, '38; derivatives of hexahydric alcohols and inner ethers thereof; use since Oct. 12, '38.

412,447. General Chemical Co., New York City; Nov. 7, '38; insecticides; use since Oct. 14, '38.

412,528. Morris L. Tanner, Chicago, Ill.; Nov. 8, '38; cleaning composition, having polishing properties, for use on automobiles and similar lacquered surfaces; use since 1935.

412,612. Neva-Wet Corp. of America, New York City; Nov. 10, '38; compound for treating textiles and fabrics of all kinds, furs, cellulose, paper, and fibrous materials, to render them sanitary and germproof; use since Oct. 20, '38.

412,633. Gamble Stores, Inc., Minneapolis, Minn.; Nov. 12, '38; paint; use since Oct. 1, '38.

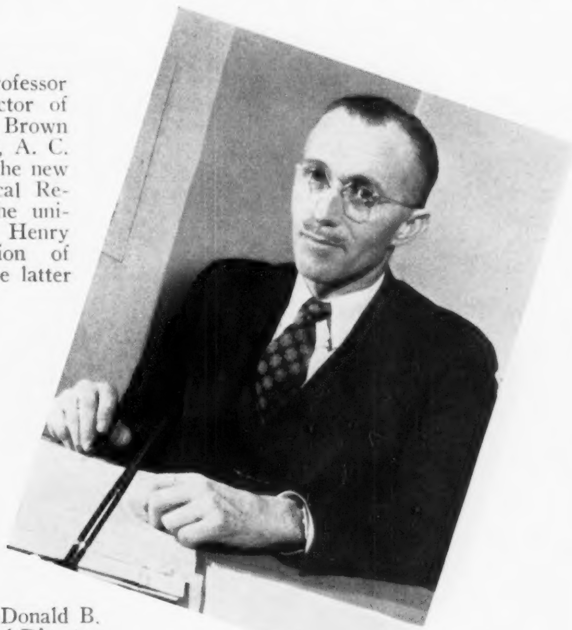
412,651. Mathieson Alkali Works, New York City; Nov. 12, '38; chlorine carrier, algaecide, fungicide, deodorant and disinfectant for water treatment; use since Mar. 17, '38.

412,832. Synthetic Nitrogen Products Corp.; New York City; Nov. 16, '38; fertilizers; use since Nov. 2, '38.

Contest Awards: The Jury of Award of the 1st Instrumentation Contest analyzing the entries to the Contest sponsored by the Industrial Instruments Section of the Scientific Apparatus Makers of America and conducted by the magazine *Instruments*. Seated, left to right: Major M. F. Behar, Editor, *Instruments*; R. J. S. Pigott, Head Eng. Dept., Gulf Research & Dev. Co.; J. M. Roberts, President, Scientific Apparatus Makers of America; Dr. Lyman J. Briggs, Director, National Bureau of Standards; Dr. John J. Grebe, Director, Physical Research Lab., Dow Chemical; standing: Phil T. Sprague, Chairman, Industrial Section, Scientific Apparatus Makers of America and President, Hays Corp.; Richard Rimbach, conductor of the Contest and Publisher of *Instruments*. Contest was designed to find unusual applications of standard instruments.

Annual Dinner: The annual conference and dinner attended by executives and sales staff of the Eaton-Clark Co., Detroit distributor of industrial chemicals and manufacturer of a wide line of industrial chemical specialties, marked the One Hundred and First Anniversary of the founding of the company. Speakers at the dinner were Rufus W. Clark, Chairman of the Board; Berrien C. Eaton, president, and Richard C. Hedke, vice president, who likewise acted as toastmaster.

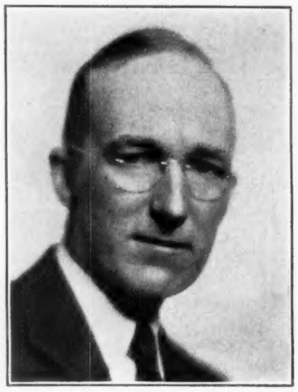
Presents Keys: Professor Charles A. Kraus, director of chemical research at Brown University and president, A. C. S., receives the keys to the new $550,000 Metcalf Chemical Research Laboratory of the university from President Henry M. Wriston. Dedication of laboratory took place the latter part of December.



Promoted: Donald B. Mason, to Technical Director of the Freeport Sulphur Co. Mr. Mason will maintain liaison between firm's research and industry's needs.

American Flange is Host: American Flange & Mfg. Company, manufacturers of Tri-Sure drum closures, entertained 250 at its annual party, held at the Park Central Hotel, on January 6. Many novel features helped to make it one of the most outstanding parties of the holiday season, including the "tin-type" photographer of the Gay Nineties. The party was under the personal direction of William Hannum, advertising manager.

President Chemical Workers: Ben. C. Britton, an employee in the power division of the Dow Chemical Company, recently elected president of the Midland Chemical Workers Ass'n.



A.I.Ch.E. Elects: Webster N. Jones president to succeed the late Frederick C. Zeisberg.

To Vice Presidency: James G. Vail, vice president, Philadelphia Quartz, becomes new vice president, A. I. Ch. E.

New Distributor: C. E. Schaad, formerly of Papermakers' Chemical Division of Hercules, is the head of Chemical Manufacturing & Distributing Co., Easton, Pa.

Reception Committee: The Drug, Chemical and Allied Trades Section, New York Board of Trade, holds its organization meeting and lays plans for its part in the coming Fourteenth Annual Banquet of the Section, to be held at the Waldorf, March 9.

SHARPLES AMYL CHLORIDES

Sharples Amyl Chlorides are available in unlimited commercial quantities and at attractive prices. They therefore play an important part in chemical syntheses.

Frequently—in producing highly diversified synthetic materials—the presence of amyl groups in the molecule brings about an entirely different result than the corresponding lower alkyl derivatives. This striking behavior is seen in synthetic resins, dyestuffs, germicides, insecticides, flotation reagents and many other compounds.

Because of their excellent solvent properties, Sharples Amyl Chlorides are being used to replace other solvents in the cleaning of type and type rolls in rotogravure work and other color printing.

SPECIFICATIONS

Color	Straw to deep purple*
Specific Gravity at 20°C.	0.88
Acidity as HCl	Not over 0.03%
Amylene and Pentane Content	Less than 3.0%
Distillation	95% between 85-109°C.
Weight per Gallon	7.33 lbs.
Flash Point	34°F.
Vapor Pressure at 20°C.	42.8 mm.
Water Solubility	Negligible
Water Azeotrope at 77-82°C.	90% $C_5H_{11}Cl$ (Approx.)

**Can be furnished water-white at slight additional cost.*

SHARPLES BUTYL CHLORIDES

are now available in commercial quantities . . . with the following specifications:

SPECIFICATIONS

Color	Water-white
Specific Gravity at 20°C.	0.88-0.89
Water Content	None
Acidity as HCl	Trace
Distillation:	
Initial Boiling Point	Not below 71.0°C.
95% Distils	Between 75.0-83.0°C.
Final Boiling Point	Not above 86.0°C.
Weight per Gallon	7.36 lbs.
Flash Point	Less than 40°F.
Water Solubility	Insoluble

A number of commercially interesting organic syntheses are possible with this raw material. It is convenient to use as an alkylating agent, especially for the production of mixed alkyl or aryl derivatives such as those obtained by reacting with aniline, naphthylamines and other organic amines.

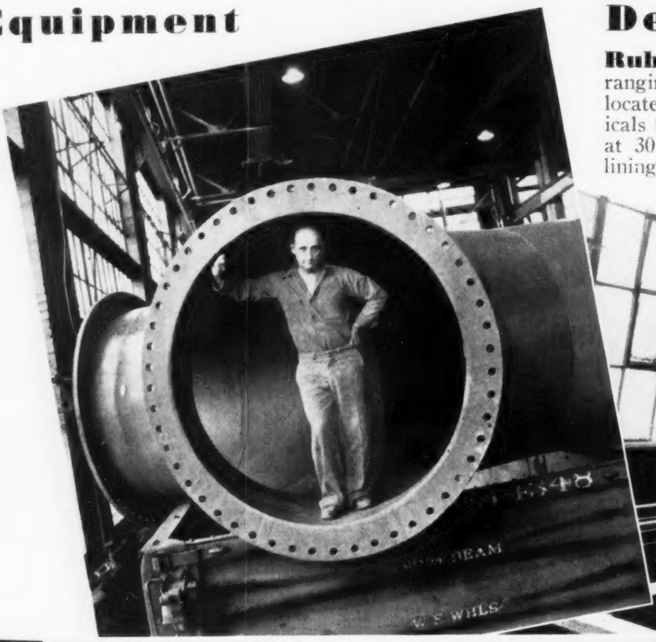
THE SHARPLES SOLVENTS CORP.

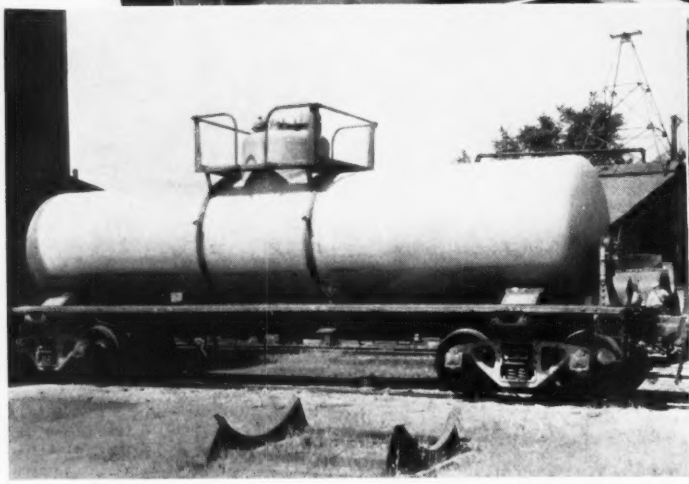
PHILADELPHIA • • • CHICAGO • • • NEW YORK

SHARPLES TRADE MARK SOLVENTS

Equipment Developments

Rubber-lined Pipe: over 100 ft. of special rubber-lined pipe, ranging from 42" to 72" in diameter will be installed in the large plant located on the Atlantic seaboard engaged in the production of chemicals from sea water. Pipe will handle chlorinated and acidified water at 30° C., and was lined with a 3/16" thick Vulcalock hard rubber lining by The B. F. Goodrich Co., as a protection against corrosion





Koroseal-lined Tanks: resist hydrofluoric, nitric, and other highly corrosive acids. A common method is to line the tank with a special fabric which is then treated with Koroseal solution, product of The B. F. Goodrich Co. This construction requires no vulcanization and will withstand temperatures up to 212° F.

Stainless Steel: A significant recent application of stainless steel is the first tank car of welded columbium-bearing stainless steel as developed by Electro Metallurgical Co. Columbium content eliminates possibility of intergranular corrosion when the stainless steel is stress-relieved after welding, and thus facilitates complete compliance with the stress-relieving requirements of the Tank Car Committee of the Association of American Railroads. Car is used experimentally for transporting high-purity chemicals.

Chemical Plants in South Africa

Candid Camera Snapshots: of chemical plants in South Africa taken by Dr. Walter S. Landis, American Cyanamid, on his recent trip to that country. Left is an alcohol plant producing ethyl, anhydrous ethyl alcohol, butyl alcohol, esters, acetic acid, vinegar and dry ice. Right, in this plant the African Products Manufacturing Co. produces corn starch, corn oil, and various maize products. These photographs are interesting illustrations of the growing industrial chemical industry of South Africa.

ADVERTISING PAGES REMOVED

ALCOHOL USERS FORM COUNCIL

Final Plans Drafted at Luncheon Meeting Jan. 24—Trigg Elected Chairman—Idea, First Suggested by James P. McGovern, Widely Endorsed by Consuming Industries—

The Council of Industrial Alcohol Users became a fact on Jan. 24. Representatives of practically all industrial groups using alcohol as an important raw material attended the luncheon meeting held at the Chemists' Club in N. Y. City at which the new, nationwide organization was launched. Its purpose is to coordinate the interests of alcohol users and to prevent unreasonable restriction of the sale and use of alcohol for industrial purposes.

The Council of Industrial Alcohol Users is designed to comprise all national trade, technical, and scientific organizations of such users, the constituent organizations being coordinated in an executive committee composed of one delegated representative of each organization. The council is the outgrowth of the recognition that unreasonable restriction of the industrial supply of alcohol might be attempted in state legislatures as a result of the recent decisions of the Supreme Court of the U. S. which gives the states paramount powers to control intoxicating alcoholic beverages as they see fit. The possibilities consequential of these decisions were presented to the gathering bv James P. McGovern, general counsel of the Industrial Alcohol Institute, who had proposed the formation of a council of industrial users of alcohol some weeks before and had promoted the meeting.

Held under the sponsorship of the Industrial Alcohol Institute, the meeting was convened by Bruce Puffer, of Commercial Solvents, vice-president of the institute. Miss R. E. Boyce, executive secretary of the institute, acted as secretary of the meeting.

Speakers Discuss Benefits

The plan of forming a Council of Industrial Alcohol Users was endorsed by a large number of speakers. D. H. Killeffer, "pinch-hitting" for Dr. Harrison E. Howe, spoke on the past efforts of the A.C.S. in behalf of the users of industrial alcohol. Other speakers included Dr. M. H. Ittner; Carroll Dunham Smith, president of the American Pharmaceutical Association; L. P. Symmes, president, Flavoring Extract Manufacturers' Association; Hugo Mock, counsel of the Toilet Goods Association; Charles P. Tyrrell, secretary of the Proprietary Association; and Hubert O'Malley, counsel of the Beauty and Barber Supply Institute.

Others voicing strong endorsement were:—M. Q. Macdonald, general counsel of the National Paint, Varnish and Lacquer Association, and Alfred D. Van Buren, formerly chief counsel of the Federal prohibition unit. The public relations angle of the new body was discussed by Hugh Craig, *Oil, Paint & Drug Reporter*, and Ray Schlotterer, secretary of the Drug, Chemical and Allied Trade Section of the N. Y. Board of Trade.

The following were selected as officers of the new council:—Chairman, Ernest T. Trigg, president of the National Paint, Varnish and Lacquer Association; vice-chairman, Carroll Dunham Smith, president of the American Pharmaceutical Manufacturers' Association; executive secretary, Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*; treasurer, Rowland Jones, Jr., Washington representative of the National Association of Retail Druggists and secretary of the National Drug Trade Conference.

ERNEST T. TRIGG

N. P. V. & L. A.'s president heads Industrial Alcohol Users Council

A Typical American Company

Monsanto Chemical, which scored a decided triumph a year or so ago with its financial report to its workers, has again pointed the way with an enlightening analysis of the ownership of the company.

Designed to show the widespread ownership of American industry, the Monsanto analysis combines a statistical breakdown of stock holdings with illustrated descriptions of Monsanto stockholders and an explanation of how these stockholders run the company. Study is published in current issue of the Monsanto magazine which is distributed to employes and stockholders.

The statistical breakdown shows that Monsanto's 10,170 stockholders include 3,890 men, 3,714 women, 316 joint owners, 1,601 trusts and estates, 34 investment trusts, 42 universities or colleges, 72 insurance companies, 121 hospitals, charitable or educational foundations, 192 brokers, and 188 other unclassified individuals or groups. Those having an indirect interest in the company include 25,-000,000 holders of life insurance policies, 170,000 owners of investment trust securities, and 80,000 students in universities, colleges.

The company chose Cincinnati, where it has no plant or laboratory, as a typical American city in which to analyze the characteristics of its stockholders.

Alliance to Washington

The Chemical Alliance has transferred its headquarters from N. Y. City to Washington and now has its offices in the Woodward Bldg.

At its recent annual meeting the alliance elected 3 new directors, C. S. Munson, of U. S. I.; H. M. Hooker, Hooker Electrochemical; and T. P. Walker, Commercial Solvents; to fill vacancies that had been created by deaths. At its subsequent meeting the board of directors elected the following officers:—President, Charles Belknap, Monsanto Chemical, St. Louis; Vice-presidents, Lammot du Pont, C. S. Munson, U. S. I.; and Willard H. Dow, Dow Chemical; Treasurer, J. W. McLaughlin, Carbide & Carbon Chemicals; Secretary, Warren N. Watson, Woodward Bldg., Washington.

Wants Free Weed-Killers

Identical bills providing for cooperation by the Federal government in State programs for the eradication of noxious weeds have been introduced in the Senate and House by Sen. D. Worth Clark (Idaho) (S. 771) and Rep. Henry C. Dworshak (Idaho) (H. R. 2666).

Measure would authorize appropriation of $25,000,000 for the fiscal year ending June 30, '40, and for each fiscal year thereafter a sum sufficient for the purposes of the act to be used for payments to states which have complied with the rules and regulations promulgated by the Secretary of Agriculture for control of noxious weeds, and have had approved by the secretary their plans for the control of such weeds.

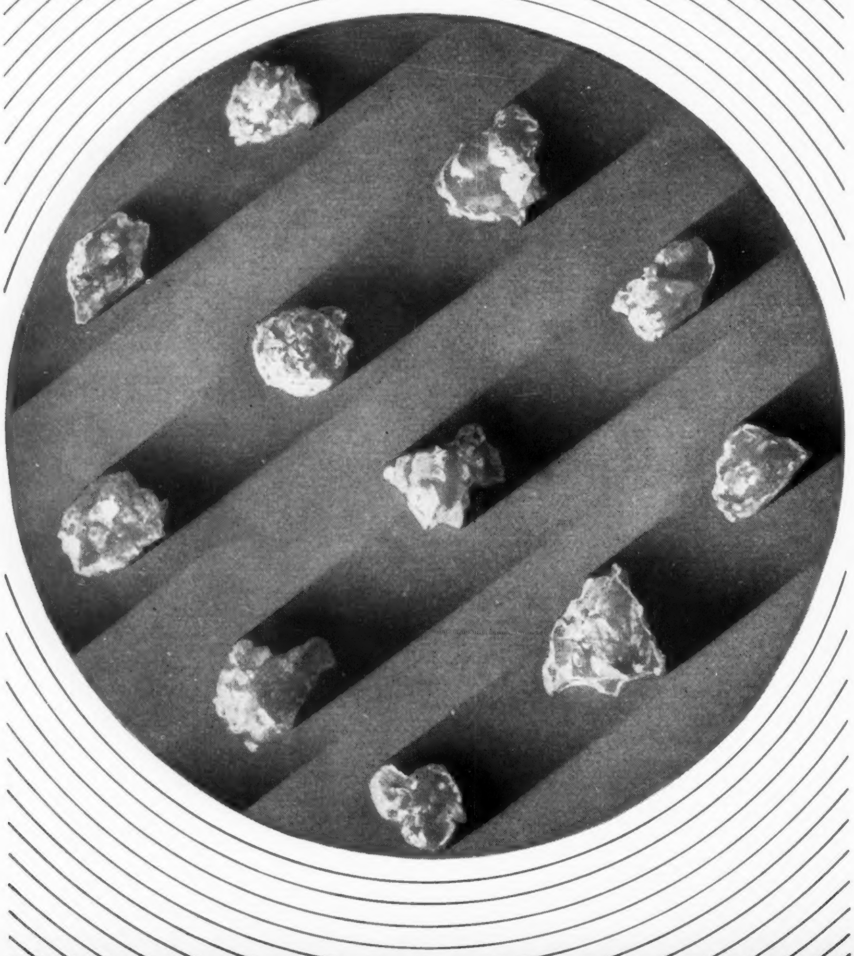
A bill (H. R. 196) introduced by Rep. Walter M. Pierce (Oregon) would provide for Federal government manufacture and distribution of chlorates for weed control.

Nichols Holdings Disclosed

Edward R. Nichols, copper magnate, who died on Sept. 30, '35, left a net estate, before taxes, of $8,962,793, according to a transfer tax appraisal filed on Jan. 23. Among the security holdings were 22,987 shares of Allied Chemical, and 3,056 shares of the preferred. Also were included 14,505 shares of Phelps Dodge Corp.

Investigate DU PONT POTASSIUM SILICATE

DU PONT
REG. U. S. PAT. OFF.



A chemical with several interesting characteristics which may suggest applications in your products.

Weight ratio $SiO_2:K_2O = 2.5$; molar ratio $SiO_2:K_2O$ approx. 3.9; colorless. Available in both glass and solution form.

Uses: Non-efflorescing base for inorganic paints and protective coatings; flux coating of welding rods; binder in the manufacture of carbon arc light electrodes.

We invite your inquiry on DU PONT Potassium Silicate.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GRASSELLI CHEMICALS DEPARTMENT
Wilmington, Delaware
DU PONT

Industrial Leaders Optimistic Over '39 Prospects

Industry Forum Conducted By Drug, Chemical & Allied Trades Section, N. Y. Board of Trade, Hears Encouraging Statements—Derby Reports for the Chemical Industry—

"The Industry Forum—1939" under the sponsorship of the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade, held as a luncheon meeting at the Astor on Jan. 17, included such prominent speakers as Harry L. Derby, president, American Cyanamid & Chemical; R. D. Keim, vice-president of Squibb; Edward Plaut, president, Lehn & Fink Products; W. Y. Preyer, president, Vick Chemical; Capt. William J. Schieffelin, Jr.; and Hugh Craig, *Oil Paint & Drug Reporter*. K. B. Hurd, vice-president of *American Druggist* was toastmaster. A decidedly optimistic note was sounded by all of the speakers.

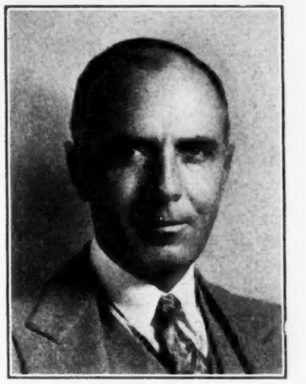
Said Mr. Derby, "If my business experience of 30 years spent in the chemical industry has taught me anything, it has been the wisdom of caution when occupying the role of a prophet. The industry with which I am connected has made such tremendous strides in the last 20 years that it is with some degree of safety that one may predict a reasonable continuation of the advancement both in the scientific realm as well as in the business field. However, the chemical industry, together with all industry, from time to time encounters a dip in the business curve, and during the past 12 months we experienced, together with all other business, at least a temporary set-back.

Chemicals—A Business Barometer

"If one inclined to study curves and charts will pursue those relating to the chemical industry he will find that since the world war the curve representing the business of the chemical industry has followed very closely the curve of general business. As a matter of fact, the chart of chemical activity is slightly in advance of that of general business, for the reason that with 20 millions of dollars annually spent by our industry for research, there has been a constantly expanding chemical production and many of the new products have supplanted the products of other industries.

"The Dept. of Labor is authority for the figures which show that, contrasting October, 1938 with October, 1937, all industry had a decline of employment of 16.6%, whereas in the chemical industry the decline for the same period was 11.8%.

"While realizing, of course, that many factors, such as the European and Asiatic conditions and our domestic political situation, may have a compelling influence on the future of our industry, nevertheless (I have, I suppose, always been classified as an optimist, and I trust ever will be) I am of the opinion the progress of our industry and the nation as a whole will continue; and I say this in spite of the



HARRY L. DERBY

"Management as well as labor is using increasingly better judgment"

realization of all the difficulties through which we are passing, because I am firmly of the belief that our country with its foundation resting upon a wisely drawn constitution cannot long be held back. Our extensive natural resources, our favorable and diversified climate, our geographic location, and the spirit of our people are definite guarantees of progress; and the courage which created this nation and which has carried it on to its present heights will continue to meet any emergency.

"It is becoming increasingly apparent that during the transitional period in labor relations sanity is asserting itself, and I think management as well as labor is today using increasingly better judgment."

COMING EVENTS

Pittsburgh Section, A. C. S., Pittsburgh Award Address, Feb. 16.

Technical Association of the Pulp & Paper Industry, Hotel Roosevelt, N. Y. City, Feb. 20-23.

Southern States Federation Associates, Nat. Fed. of Paint & Varnish Production Clubs, Memphis, Tenn., Hotel Peabody, Feb. 24-25.

Packaging Exposition, Hotel Astor, N. Y. City, March 7-10.

N. J. Sewage Works Association, 24th Annual Meeting, Hotel Stacy-Trent, Trenton, N. J., March 9-10.

N. Y. Section, A. C. S., Wm. H. Nichols Medal, March 10.

American Chemical Society, Spring Meeting, Baltimore, Md., April 3-7.

Southern Textile Exposition, Greenville, S. C., April 3-8.

American Ceramic Society, Annual Meeting, Hotel Stevens, Chicago, week of April 16.

Electrochemical Society, Spring Meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 26-29.

National Association of Purchasing Agents, San Francisco, Hotels Fairmont and Mark Hopkins, May 22-25.

American Institute of Chemical Engineers, Akron, Ohio, May (exact date to be announced later).

American Association of Cereal Chemists, Kansas City, Mo., May 22-26.

American Water Works Association, 59th Annual Convention, Atlantic City, N. J., Hotels Ambassador and Chelsea, June 11-15.

American Pulp & Paper Mill Superintendents Association, Washington, D. C., Wardman Park Hotel, June 13-15.

American Electro Platers Society, Asbury Park, N. J., June 19-22.

American Society for Testing Materials, 42nd Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, June 26-30.

16th Colloid Symposium, Division of Colloid Chemistry, Stanford University, Calif., July 6-8.

American Public Health Association, William Penn Hotel, Pittsburgh, Pa., Oct. 17-20.

Lavadan Heads Gas Makers

P. F. Lavadan, vice-president, Liquid Carbonic, was elected president of the Compressed Gas Manufacturers' Association at the 26th annual meeting, held at the Waldorf-Astoria, N. Y. City on Jan. 23-24.

Other officers elected were:—First vice-president, G. O. Carter, of International Acetylene Association, and second vice-president, D. A. Prichard, of Canadian Industries, Ltd., and secretary-treasurer (re-elected), Franklin R. Fetherson.

Phila. Drug Exchange Elects

At its 78th annual meeting, Jan. 24, the Philadelphia Drug Exchange elected the following officers:—President, E. Leidy Brendlinger, of the Dill Company, Norristown, Pa.; vice-president, Dr. Charles E. Vanderkleed, of McNeil Laboratories, Inc.; secretary, J. Mervin Rosenberger, of Smith, Kline & French, Inc.; treasurer, Harold C. Halberstadt.

C. A. C. Re-elects Landis

Dr. Walter S. Landis, American Cyanamid, has been re-elected president of the Chemist Advisory Council, at the first annual meeting, held recently in the Chemists' Club, N. Y. City. Other officers re-elected were:—Vice-president, William T. Read, dean of the School of Chemistry of Rutgers; treasurer, Robert T. Baldwin, and secretary, M. R. Bhagwat.

Mr. Bhagwat, in his report as secretary, stated that the council, the only agency in existence working solely in the interest of the chemist who is unemployed or unsatisfactorily placed, during the year registered 690 individuals. All have at least one degree in chemistry, and 10% have a Ph.D., and more than half have considerable industrial experience. Specifications for 138 vacancies were received, and 87 registrants reported that they had secured permanent employment. In addition to this qualified group, more than 200 inquiries were received from persons having insufficient education or experience to register with the council. Offices of the council are maintained at 300 Madison ave., N. Y. City, and no charge is made for its service.

Prices per lb. — carloads

	Old Price	New Price
GLYCERYL OLEATE	~~20¢~~	13¢
GLYCERYL MONORIC-INOLEATE	~~24¢~~	19¢
GLYCERYL MONO-STEARATE	~~23¢~~	18¢
DIGLYCOL LAURATE	~~22¢~~	16¢
DIGLYCOL LAURATE (neutral)	~~23¢~~	17¢
DIGLYCOL OLEATE	~~20¢~~	13¢
DIGLYCOL STEARATE	~~24¢~~	20¢
PROPYLENE GLYCOL STEARATE	~~28¢~~	22¢

These materials range from liquids to solids, dependent on the fatty acid used. They are being used as emulsifiers, thickeners, suspending agents, and lubricants for textiles, leather, paper, rubber, cosmetics, polishes, petroleum products, special detergents, and for wetting out pigments.

For many years Glyco has made a specialty of the manufacture of the fatty acid esters of Glycerine, Propylene, Glycol and Diethylene Glycol. These products have grown steadily in importance, and their use has spread into many industries.

The big volume in which these materials are being used today has resulted in definite economies and savings in their manufacture. Glyco is happy to announce that these savings will be passed along to users in the form of greatly reduced prices.

The figures indicated on this page are the new low prices per pound now in effect for carload orders. Prices on smaller quantities have also been reduced. The entire new price schedule will be furnished on request together with complete information about each material. We will gladly send free samples of any of the materials in which you are interested.

GLYCO PRODUCTS COMPANY, INC.

148 LAFAYETTE ST. (Dept. 2) NEW YORK, N. Y.

For quick service call the GLYCO representative nearest you

CALIF.—Los Angeles MARSHALL DILL
2465 Porter Street • Trinity 9575

CALIF.—San Francisco MARSHALL DILL
30 Bluxome Street • Garfield 7526

COLO.—Denver DENVER FIRE CLAY CO.
1742 Champa Street • Tabor 0251

ILL.—Chicago
MIDCONTINENT CHEMICALS CORP.
6803 North Clark Street • Rogers Park 5252

IOWA—Des Moines
THOMPSON-HAYWARD CHEMICAL CO.
S. W. 1st & Granger • 3-8151

LA.—New Orleans
THOMPSON-HAYWARD CHEMICAL CO.
P. O. Box 487 • Raymond 0797

MASS.—Framingham W. A. KINGMAN
Framingham 3476

MICHIGAN—Detroit
JOHN W. SCHUMACHER
235 Woodland Avenue • Townsend 8-8419

CANADA, TORONTO 2
CANADA COLORS & CHEMICALS, LTD.
1090 King Street West • Kenwood 7961

MINN.—Minneapolis
THOMPSON-HAYWARD CHEMICAL CO.
909—2nd Street, South • Geneva 3643

MO.—Kansas City
THOMPSON-HAYWARD CHEMICAL CO.
29th & Southwest Blvd. • Valentine 2473

MO.—St. Louis
THOMPSON-HAYWARD CHEMICAL CO.
1100 No. Levee Street • Chestnut 2170

NEBRASKA—Omaha
THOMPSON-HAYWARD CHEMICAL CO.
1110 S. 4th Street • Webster 4700

NEW YORK—Rochester
SCOBELL CHEMICAL CO.
Rockwood Place

OHIO—Akron WHITE & CO.
7 West Bowery Street • Blackstone 4185

OHIO—Cincinnati C. M. DURBIN CO.
49 Central Avenue • Cherry 7881

OHIO—Cleveland WHITE & CO.
1505 Broadway Street • Cherry 4587

CANADA, MONTREAL CHEMICALS, LTD.
384 St. Paul Street West • Plateau 5851

OREGON—Portland D. W. FERGUSON
1501 N. W. Kearney Street • Beacon 6904

PENNA.—Philadelphia
LEONARD S. LEVITT
49 East Cliveden Street • Tennessee 2768

TENN.—Memphis
IDEAL CHEMICAL & SUPPLY CO.
631 Monroe Avenue

TEXAS—El Paso DENVER FIRE CLAY CO.
Main 2486

TEXAS—Houston
RUSSELL HALE CHEMICAL CO.
2812 Center Street • Preston 4133

UTAH—Salt Lake City
DENVER FIRE CLAY CO. • Wasatch 5344

WASH.—Seattle CARL F. MILLER & CO.
1217—6th Avenue South • Main 4330

WASH.—Spokane CARL F. MILLER & CO.
East 802 Pacific Avenue • Lakeview 2233

CANADA, VANCOUVER, B. C.
SHANAHAN'S, LTD.
Foot of Campbell Avenue • Highland 4561

Reports On Wood Preservative Chemicals

American Wood Preservers' Association Holds 35th Annual Meeting—A. S. T. M. Plans Research On Tests For Textile Finishes—G. E. and R. C. A. Offer New Specialties—

News of the Specialties

The 35th annual meeting of the American Wood Preservers' Association, held in Washington, Jan. 23-26, attracted nearly 500 and was largely devoted to presentation and discussion of a large number of committee reports and special papers on the subject of improving wood-treating processes and the development of new uses for treated wood.

The committee on preservatives presented a report on the matters intrusted to it at the 1937 meeting—revision of the manual and study of toxic materials as to suitability for wood preservation. The latter topic included analysis of data on the use of creosote and mixtures of this agent with petroleum or coaltar and a study of the use of mixtures of zinc chloride and sodium bichromate.

Manual standards were approved for the determination of tar acids in creosote oil and for specifications for preservative oils for nonpressure treatments. A new tentative standard was recommended for volume correction tables for petroleum oils.

The report included a comprehensive appendix on the effect of sodium bichromate on the preservative value of zinc chloride. This described the considerable amount of work which had been done on the problem of adding to the preservative value of zinc chloride. A combination of zinc chloride, 81.5%, and sodium bichromate, 18.5%, had been developed. This proportion of the two salts was designed so that with a three-quarter pound per cu. ft. treatment, there would be at least one-half pound per cu. ft. of unchanged zinc chloride in the wood.

Data were presented, both on the basis of laboratory tests and of outdoor accelerated service tests, which showed that the addition of sodium bichromate increased very substantially the value of zinc chloride as a wood preservative.

Tests For Textile Finishes

The Steering Committee on Research for Testing Textile Finishes of the A. S. T. M. held a meeting of subscribers to its research fund on Jan. 26, at the Chemists' Club in N. Y. City.

At the meeting arrangements were made for undertaking the Committee's research program which will be carried out by a research associate to be appointed shortly.

The subscribers to the research fund to date are: American Viscose Corp.; du Pont; The Hart Products Corp.; Hercules Powder Co., Providence Dry-Salters Division; National Oil Products; Sandoz Chemical Works; Scholler Brothers; Sears-Roebuck; and Tubize Chatillon.

The Steering Committee was organized in May 1938 under the sponsorship of Committee D-13 on Textile Materials of the American Society for Testing Materials. L. B. Arnold, Jr., is chairman, and E. A. Georgi is secretary of the Steering Committee.

The object in organizing the research program of this committee was to establish definite physical testing methods which would supplant the empirical methods now generally used in the textile industry.

New Household Specialties

That more and more the large companies are becoming specialty minded is amply demonstrated by the new washing compound being marketed by General Electric and a new furniture polish recently placed on the market by RCA Manufacturing Co., Trenton, N. J. The label features the famous Victor Dog trademark of Victrola days. G. E. is marketing the washing compound in two types, according to the hardness of the water. Product will be marketed through the company's dealer outlets.

Issues "Foto News"

Burto Co., 521 5th ave., N. Y. City, manufacturer of solvent reclamation and clarification powder, is now issuing "Foto News" to the dry cleaning trade in the U. S. and Canada.

Quaker Adds To Staff

Dr. Henry H. Gilmann, formerly chief chemist for City Chemical and previous to that technical director for Glyco Products, is now with the research staff of Quaker Chemical Products, Conshohocken, Pa. He will work on development of resin finishes of all types, organic detergents and wetting agents.

Robert Zametkin is now on the technical development staff of the company and will act in a technical capacity servicing the trade in the Metropolitan N. Y. area.

Distributes Bonus

S. C. Johnson & Sons, Racine, Wisc., producer of wax products for household use, presented its 19th annual bonus to 850 employees at the year-end. A party for the employees followed the bonus distribution.

Awarded $10,000 Damages

A jury in the Supreme Court at White Plains, N. Y., on Jan. 13, awarded $10,000 damages to a Mrs. Jessie Canavan, for the loss of the sight of her eye in '35 when the wooden stopper in a bottle of peroxide blew out and hit her. The Cardone Co., manufacturer of the peroxide and the American Peroxide Co., bottlers of the product, both of N. Y. City, were the unsuccessful defendants in the action. The retailer and wholesaler were freed of responsibility. Plaintiff claimed the product was improperly prepared and bottled.

Buettner Re-Elected

William O. Buettner has been re-elected president of the Associated Exterminators and Fumigators of New York. He is also the secretary of the National Pest Control Association, with offices at 3019 Fort Hamilton Parkway, Brooklyn.

New Easton, Pa., Distributor

Chemical Manufacturing & Distributing Co., Easton, Pa., is a new firm in the manufacture and distribution of industrial, institutional, laundry and textile chemicals. C. E. Schaad heads the new organization. He was formerly with the Paper Makers' Chemical Division of Hercules. Plant was formerly occupied by Hercules and is located at 6th and Lenicton sts.

Haas With Keystone

Keystone Aniline & Chemical, Chicago, reports addition of Raymond Haas as assistant to Victor Olsen, chief chemist. He will specialize on dyes.

Company has just added several new dyes to its line, and additional information can be obtained by addressing the company at 321 N. Loomis st., Chicago.

Widens Service To Consumers

Rex Chemical, Chelsea, Mass., adds T. S. Rovelstad to its sales staff. Company manufactures finishes for kid leathers. Mr. Rovelstad has been a tanner for years and brings a wealth of practical information to leather companies.

AHCO's New Warehouse

Arnold, Hoffman & Co., chemical distributor and specialty manufacturer, Providence, R. I., opens a warehouse at Charlotte, N. C., with Stephen J. Hawes in charge.

Purex In Larger Quarters

Purex Corp., maker of a household hypochlorite bleach and other sanitary chemicals, is in larger factory quarters at Chippewa st. and Ridgewood ave., St. Louis. Another plant is located at South Gate, Calif.

NEW! CHEMICALS FROM SEAWATER

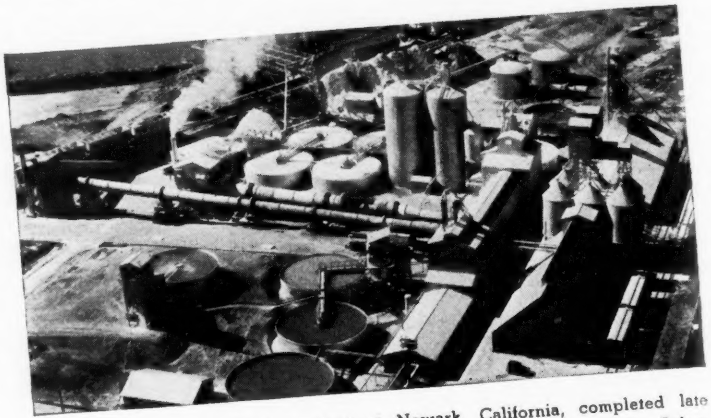
HOW CAN YOU APPLY THEM TO CUT COSTS OR IMPROVE PRODUCTS?

The breadth of application of magnesium oxide, "manufactured" from seawater bittern, has yet to be fully investigated. New uses are constantly being found.

If these chemicals can be useful to you, they offer two very important advantages – limitless supply at quantity production prices – plus dependable uniformity from close chemical control.

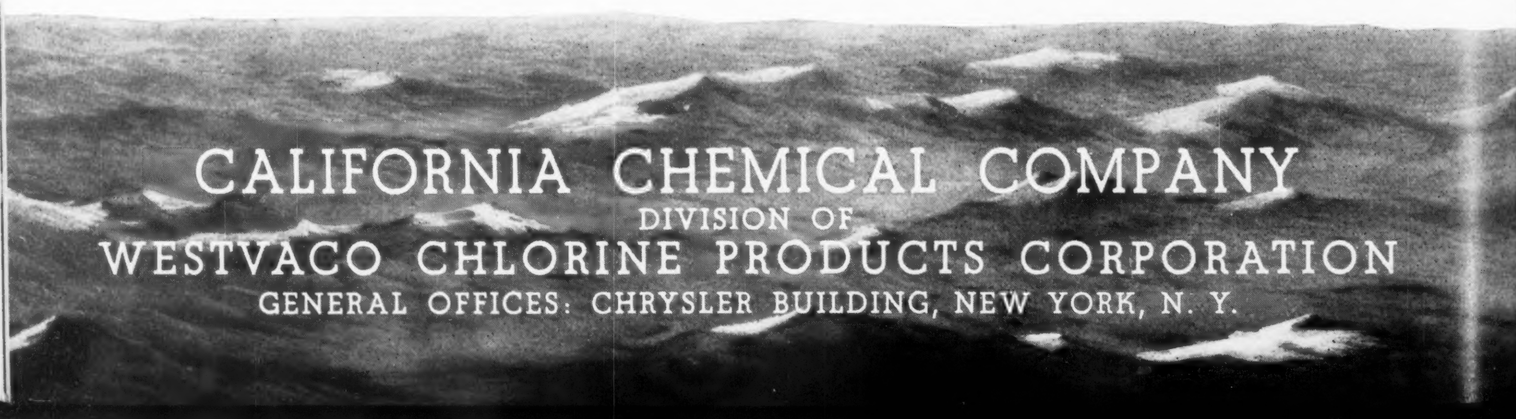
Definitely an improved product, impurities inherent in mined magnesite are not present in the seawater product. Ample production capacity is assured – "reserves" of raw materials are as unlimited as the Pacific Ocean! Chemical analysis and physical properties can be altered to meet your needs.

We should like to have the opportunity to put our resources of technical cooperation and data at your disposal in determining whether "Chemicals from Seawater" can contribute to the improvement of your processes, products or costs. Adequate samples and price quotations will be sent without obligation.



Shown above is the modern plant at Newark, California, completed late in 1937, for the manufacture of chemicals from seawater bittern. Below is a table of characteristics of a few of the Magnesium Oxides available in tonnage quantities and in any desired uniform chemical analysis.

Name	Typical Analysis % (Ignited Basis)	Physical Conditions (Unground)	Typical Known Use
Adsorptive Granular Magnesia (Highest Activity) No. 2652	SiO_2 1.7, Fe_2O_3 .2, Al_2O_3 .4, CaO 2.1, MgO 95.6	98% minus 8 mesh, 90% plus 28 mesh, 1% max. minus 48 mesh.	For regenerating spent solvents.
Adsorptive Powdered Magnesia (Medium Activity) No. 2641	SiO_2 .7, Fe_2O_3 .2, Al_2O_3 .3, CaO 1.5, MgO 97.3	Mixed soft lumps and powder.	For separation of vitamins and similar substances.
Adsorptive Powdered Magnesia (Highest Activity) No. 2642	"	Mixed soft lumps and powder.	For decolorizing oils, solvents, and deodorizing, etc.
Chloride-Free Magnesia No. 2661	"	Mixed medium soft lumps and powder.	For general chemical purposes.
Plastic Magnesia No. 2662	"	Mixed soft lumps and powder.	Oxchloride cements, basic carbonate, etc.
"Quick" Magnesia No. 2663	"	Mixed soft lumps and powder.	Where small particle size and high chemical activity are desired.
Chemical Grade Magnesia No. 2664	"	Mixed soft lumps and powder.	Neutralizing acids, etc.
Seawater Periclase No. S96	"	Mixed hard lumps and fines 100% minus 5/8".	Where exceptional high-melting point refractory is required.



Heavy Chemicals

Industrial Chemical Consumption In Seasonal Rise

Rate of Recovery From Year-End Low Slightly Disappointing —Tin Derivatives Decline—Tungsten Lowered—Acetic Competitive—Yellow Prussiate of Potash Reduced—

Recovery from the low seasonal year-end level was gradual in January. Some disappointment was expressed by producers and distributors over the volume and the fact that there was no sharp rebound in industrial chemical shipments. Yet, compared with either December or January, the month was satisfactory from tonnage point of view. Because of the uncertainties existing, buyers continued to hold to a conservative policy of placing orders for spot purchases and in ordering material against existing contracts.

Price changes were few and generally were the result of price revisions in the metals. All of the tin derivatives were lower at the month-end, the result of definite weakness in the Straits metal. Early in the month a 70c reduction was announced in tungsten metal powder, the new price level being $2.10-$2.20 per lb. Late in the month a lower price went into effect for C. P. tungsten oxide, the decline amounting to 25c per lb. The new schedule is $2.40-$2.60, depending upon quantity. Quotations were withdrawn on the technical grade and a new and purer chemical grade was substituted with prices listed at $1.75-$1.85, depending upon quantity. C. P. tungstic acid was also reduced 25c per lb. The new price ranges from $2.35 to $2.55. Quotations for the technical grade were withdrawn and a more refined grade is now offered at $1.70-$1.80 per lb.

A revision has been made in the price schedule for anhydrous sodium tetrapyrophosphate. Prices formerly were quoted on a freight allowed basis. Now quotations east of and including Denver are on an f.o.b. works, freight equalized basis. The new schedule is as follows: Bags, carlots, works, freight equalized, $5.10 per 100 lbs., less carlots, $5.35 per 100 lbs.; barrels, carlots, freight equalized, $5.30 per 100 lbs., l.c.l. lots $5.55 per 100 lbs. Quotations in the various metropolitan areas for l.c.l lots are on a delivered basis. With new producers coming into this field and with the older producers expanding manufacturing facilities, the price of this interesting and comparatively new detergent has been gradually dropping, thus opening up new uses and new sales outlets.

Producers of lead arsenate and Paris Green report that prices have been renewed for the coming season. Quite a little business has already been placed. The dealer's schedule on lead arsenate is as follows:—carlots, in bags, east or west of the Rockies, 11c; l.c.l. quantities, west of the Rockies, 11¼c; l.c.l. quantities, east of the Rockies, 11½c. The schedule for Paris Green is as follows:—drums, barrels, f.o.b. works, freight allowed, carlots, 23-25c; l.c.l. quantities, same basis, 24-26c, per lb.

The competitive position of acetic in certain sections continues unchanged. Also, quite a little competition exists between domestic and imported formic. A similar condition prevails in the market for sodium silicofluoride. A good demand for calcium chloride in the Middle West and Eastern states was based on ice control needs. All of the electroplating chemicals were active. The alkali volume, while not up to earlier expectations, was fairly satisfactory, and the same statement might well be used to describe the situation in bichromates. A reduction of 1c per lb. was announced in the third week of the month for yellow prussiate of potash. The new schedule is based on 15c for spot material and 14c as the contract price. There was no change in the red material.

There is a good demand for chlorine. Copperas shipments are fairly heavy. The manufacturers of arsenicals are taking much larger quantities of arsenic. Copper sulfate is moving to such an extent that stocks are none too plentiful.

Outlook Still Favorable

The outlook for consumption of industrial chemicals over the next few months is still very bright, despite the uncertainties that have cropped up. Practically all of the chemical converting and chemical processing industries are expected to operate on fairly active schedules. In most lines production schedules are being increased, although in some cases the acceleration is rather slow. At this time a year ago curtailment was in evidence in every division of manufacturing activity.

Mutual Wins Zoning Suit

Mutual Chemical, manufacturer of bichromates, was awarded the decision in the Baltimore City Court on question of the validity of the Maryland airport zoning law. Judge J. Craig McLanahan ruled that the law was unconstitutional and invalid. The law was designed to restrict the height of structures on land bordering airports. The Mutual company operates a plant on 45 acres adjoining the airport.

Sulfur at the World's Fair

Visitors to the New York World's Fair will have a splendid opportunity to learn all about sulfur—how it is mined and its many industrial and agricultural uses. The Texas Gulf Sulphur Co. will have a most enlightening and interesting educational display in the Hall of Industrial Science.

Important Price Changes

ADVANCED	Jan. 31	Dec. 31
None		
DECLINED		
Acid tungstic, C. P.	$2.35	$2.60
Cobalt carbonate	1.25	1.35
chloride	.80	.83
Potassium prussiate	.15	.16
Sodium stannate	.30½	.31½
Stannous chloride (anhyd.)	.43½	.44½
Tin crystals	.35½	.36½
metal	.4520	.46¾
tetrachloride	.23¼	.23¾
Tungsten oxide, C.P.	2.40	2.65
powder	2.10	2.80

IAC Plans Expansion

International Agricultural Corp. is branching out into some of the smaller chemical fields, John J. Watson, president, told stockholders at the recent annual meeting. He explained that the directors felt that at the present time the company did not have adequate capital to go into the broad field of chemicals.

He reported that the Union Potash Mines in New Mexico had "just got down to the salts and in 6 months, we will have the answer to the extent the company will go ahead in the potash field."

Mr. Watson in commenting on the outlook for the fertilizer price structure said he was "considerably encouraged" but the tonnage prospects "are not so good."

The Story of Edison

The story of a 15 billion dollar brain is told in the February issue of *Priorities*, house organ of Prior Chemical Corp., N. Y. City. The brain is that of the "Wizard of Menlo Park," Thomas A. Edison. The article points out that while he conceived many hundreds of ideas and carried them to patent, a number of inventions identified in the public mind as Edison's were, in fact, originally the concepts of others; hence a considerable part of his fame is due to the fact that he took up and solved problems which others had given up in despair.

Emile Mond Dies

Emile Mond, 73, a nephew of the late Dr. Ludwig Mond of England, on Dec. 30. He began his technical career with Brunner, Mond, then left to found the West Indies Chemical Works in Jamaica with his friend and former fellow-student, Dr. Emile Bucher of Geneva. Later Emile Mond returned to England to become technical assistant to his uncle. He then became a member of the board of Brunner, Mond and the Mond Nickel Co.

Herman Bercow, H. H. Rosenthal & Co., N. Y. City, has returned to his desk after a stay in Florida.

Solvents and Plasticizers

Acetone In Tanks Lowered ½¢

Amyl Acetate, Amyl Alcohol, Butanol, and Butyl Acetate Also Decline—Denaturant Grade of Methanol Advanced 5c—Denatured Alcohol Off 1c—Good Demand For Solvents—

Important Price Changes

	Jan. 31	Dec. 31
ADVANCED		
Methanol, denat. grade, tks.	$0.40	$0.35
DECLINED		
Acetone, tks.	$0.04¼	$0.04¾
Alcohol, amyl (from pentane) tks.	.101	.106
c. l., drs.	.111	.116
butyl, tks.	.08	.08½
c. l., drs.	.09	.09½
ethyl, tks.	4.47½	4.48½
C. D. 14, tks.	.23	.24
spec. denat., tks.	.21	.22
spec. solvent, tks.	.22	.23
Amyl acetate (from pentane) tks.	.095	.10
c. l., drs.	.105	.11
Butyl acetate, tks.	.08	.08½
c. l. drs.	.09	.09½

Alcohol Institute Elects

The incumbent board of the Industrial Alcohol Institute was re-elected at the annual meeting on Jan. 11.

Glenn Haskell, president of U. S. Industrial Chemicals, Inc., is president; J. Warren Kinsman, manager of the Alcohol Division of du Pont is first vice-president; J. W. McLaughlin, vice-president of Carbide & Carbon Chemicals, is treasurer; Bruce Puffer, manager of industrial alcohol of Commercial Solvents was elected to the unfilled office of second vice-president; Miss R. E. Boyce was re-elected executive secretary.

New Plant For "Texon"

The Fabrikoid Division of du Pont has leased the vacant Chapin & Gould paper mill at Russell, Mass., and expects to start operating the plant early in March. Products to be made at Russell are latex-impregnated fibre sheets known as "Texon," used principally as midsoles and innersoles in shoe manufacturing.

Installing Air-Conditioning

Air-conditioning of the du Pont Building in Wilmington, at a cost exceeding $1,000,000 was begun Jan. 23. Engineers describe the job as one of the largest of the kind yet undertaken in the U. S. Seven months are scheduled for the work.

Gleason With Hummel

Edward J. Gleason has been elected vice-president of the Hummel Chemical Co., manufacturer and importer, of N. Y. City. In order to accept the vice-presidency of the Hummel organization, Mr. Gleason resigned as sales-manager of the chemical department of Charles Hardy, Inc., with whom he had been affiliated for 17 years. The Hummel organization, headed by A. Hummel, maintains stocks at strategic points throughout the country and specializes in chemicals for the pyrotechnic industry.

The solvents provided most of the interesting market news of the past month. The generally weak price position which has prevailed now for several months carried on during the past month and several important products reached new lows. The one exception, however, was in the denaturant grade of methanol. An advance of 5c was announced, bringing the new level to 40c in tanks.

Quotation for acetone in tanks was revised downward ½c per lb. to 4¼c per lb. Prices in drums for carlots and l.c.l. quantities were maintained at 5¾c and 6¼c per lb., respectively. Quotations for amyl acetate, ex pentane, were lowered ½c. The new schedule is as follows: tanks, f.o.b. works, freight allowed, 9½c; carlots, drums, 10½c; l.c.l. quantities, 11½c. Quotations for amyl acetate, ex fusel oil, were unchanged.

A ½c reduction was also made in amyl alcohol, ex pentane. The new prices are: tanks, f.o.b. works, freight allowed, 10.1c; carlots, drums, 11.1c; l.c.l. quantities, 12.1c. Butyl alcohol, because of highly competitive conditions, dropped ½c in the past month. Tanks are now quoted at 8c; carlots, drums, 9c; and l.c.l. quantities at 9½c. Butyl acetate was another important solvent that suffered a ½c per lb. decline. The 90-92% normal is now quoted at 8c in tanks, 9c in drums in carlots, and 9½c for less carlot. Secondary butyl acetate is now 6c in tanks, 7c in carlots, and 7½c for l.c.l. lots.

Denatured alcohol declined 1c per gal. in the final week of January. The various tankcar quotations are now as follows: C. D. 14, 23c per gal.; S. D. 1, 21c; S. D. 2B, 20c; S. D. 23G, 25½c; special solvent, 22c. The drum, carlot prices are as follows: C. D. 14, 31c; S. D. 1, 27c; S. D. 2B, 26c; S. D. 23G, 31½c; special solvent, 28c. The 1c reduction was also placed in effect for pure ethyl, making tanks $4.47½, drums, carlots, $4.50½.

The demand for petroleum solvents showed a steady week to week increase in the past 30 days. During the earlier part of the month considerable weakness developed at Decatur, Des Moines, Milwaukee, and Minneapolis on tankwagon quotations of cleaners' naphthas, petroleum thinners, Stoddard Solvent, and v.m. & p. naphthas, but by the end of the period under review the reductions had been eliminated.

The consumption outlook for solvents during '39 is quite bright. Current estimates place '39 automotive production at 3,400,000 units, as compared with only 2,600,000 in '37. This means 800,000 more units will have to have finishes. The rubber industry, also, is expected to show a healthy gain over the previous year's total.

December Alcohol Statistics

December ethyl alcohol production totaled 16,772,479 proof gals., as compared with 17,361,670 in December of '37. Output of completely denatured amounted to 2,111,297 wine gals., as against 1,826,805 in the corresponding month of '37. A total of 2,115,316 gals. was removed as compared with 1,841,075 in December of the previous year. Stocks on Dec. 31 amounted to 426,638 gals., while on Dec. 31, '37, they were reported as being 546,648 gals.

Production of specially denatured in December reached 8,388,939 gals., as compared with 5,185,331 in the like month of '37. There were removed 8,317,195 gals., as against only 5,129,560 in December of '37. Stocks at the end of the month were 858,630 gals., a gain over the 606,224 reported on Dec. 31, '37. Production of completely denatured in the final half of last year totaled but 14,069,538 gals., quite a drop from the 21,450,836 made in the corresponding period of the previous year. Output of specially denatured, however, was greater, the respective figures being 41,430,048 and 35,730,777.

Methanol Output Lower

November production of synthetic methanol amounted to 2,617,979 gals., as compared with 2,294,532 gals. in October and with 3,562,372 in November of '37. Output of crude methanol totaled 344,328 gals. in November of '38, as compared with 335,380 in October and 423,315 in November of the year previous.

Farr on "Viscose Rayons"

A meeting of the American Section of the Society of Chemical Industry, jointly with the A. C. S., was held Feb. 10 at The Chemists' Club, N. Y. City. Dr. Wallace P. Cohoe, chairman of the American Section, presided. Guest speaker was Dr. Wanda K. Farr who gave a talk on "Viscose Rayons". Dr. Farr first discussed the historical and botanical background of the modern rayon industry.

A. I. C. Forms New Chapter

The Illinois Chapter of the American Institute of Chemists has been formed. First meeting was presided over by Gustav Egloff, Universal Oil Products. Robert J. Moore, Bakelite, and president of the Institute, spoke on the Institute's aims. Guest speakers included Prof. Donald B. Keyes, University of Illinois, and Foster Dee Snell, consultant.

ADVERTISEMENT—*This entire page is a paid advertisement.*

Prepared Monthly by U. S. Industrial Chemicals, Inc.

SOLVENT NEWS

Reg. U. S. Pat. Off.

February ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1939

Authorized Uses Of S.D. Alcohol Under 15 Heads In New System

Treasury Dep't Revokes Eight S.D. Formulas Little Used in '38

WASHINGTON, D. C.—A new classification system for Specially Denatured Alcohol, in which the authorized uses are grouped under less than 20 general headings as compared with over 400 specific, individual uses heretofore provided, is the framework of a revised Appendix to Regulations III, made public here on January 3 in the *Federal Register*.

57 S.D. Formulas

Under the new arrangement, eight Specially Denatured Alcohol formulas have been revoked, leaving 57 formulas in force without change. The three Completely Denatured Alcohol formulas, numbers 12, 13 and 14, are continued as before.

The new Appendix was signed by Guy T. Helvering, Commissioner of Internal Revenue and was approved December 29, 1938 by Wayne C. Taylor, Acting Secretary of the Treasury.

The most striking of the changes embodied in the revised Appendix is a code system classifying uses for Specially Denatured Alcohol under 15 broad divisions, which are in turn broken down into approximately 90 authorized uses.

(*Continued on next page*)

See Container Linings As Tonnage Use For Silver

Corrosion-resistant containers represent the great immediate opportunity to develop a tonnage use for silver, concludes the Research Project on New Industrial Uses for Silver in their Seventh Progress Report, released recently.

Sponsored by leading American silver producers, the project made a survey purporting to show a real need for cans, barrels, and other containers which resist corrosion better than present types. Foodstuffs, beverages and chemicals, including caustic alkalies, organic acids, certain mineral acids and salts, are some of the suggested applications.

All possible methods of applying silver coatings, as well as methods of fabricating and joining silver-lined containers, are being investigated, the report states.

New Thickener For Paint Remover Aids Repainting

BERLIN, Germany—Paint and varnish removers thickened with *tylose*, a synthetic cellulose material, do not leave behind deposits which interfere with the proper drying and hardening of paint or varnish films subsequently applied, it is claimed in a recent issue of *Farben Chemiker*.

The following formulation is cited as typical: 100 parts of *tylose* are allowed to swell in 500 parts of methylene chloride. After dilution with 800 parts of denatured alcohol, the mixture is dissolved in 500 parts of toluene, containing 200 parts of paraffine (50°/52° C.). Silica or silicates may be added to increase the abrasive action, the article states.

'Lubricates' Leather

LONDON, England — A new leather treatment in which aqueous emulsions containing dibutyl phthalate are used to fat-liquor hides and skins was patented here recently.

Leather treated under the process is described as "lubricated" and is particularly resistant to oxidation, according to the inventor.

Transforms Rubber Into Alcohol-Soluble Resins

WASHINGTON, D. C. — Thermosetting resin oxidation products of rubber, with alcohol solubilities varying from 0-90%, may be obtained by milling crepe rubber with proper catalysts and dried wood flour, it is revealed in a patent just issued here. The resins are said to be suitable for moulding powders, varnishes or lacquers.

For example, if 100 parts of crepe rubber ("catalyzed" with 2½% cobalt linoleate) are milled with 100 parts of wood flour (100 mesh) for 30 minutes at 80-85° C., the following mixture of resins is obtained from the exothermic reaction:

"A" resin	nil
"B" resin	10%
"C" resin	90%

The inventor reports that "A" is soluble in naphtha but insoluble in alcohol and acetone. "B" is soluble in either acetone or naphtha but insoluble in alcohol. "C" is described as being soluble in both acetone and alcohol.

By employing smaller amounts of wood flour, while keeping all other conditions the same, the yields of "A" resin may be increased, according to the patent papers.

Division Offices Move

The new address of U.S.I.'s Philadelphia Office is 3200 North 17th Street; phones are Radcliffe 0220 and Park 2808.

U.S.I.'s Los Angeles office is now located at Western Pacific Building, 1031 South Broadway.

Solox Makes Ironing Easier and Faster, Shirt Company Finds

Wets Shirts, Pajamas, Collars With 50% Solox And 50% Water

As a result of employing Solox, proprietary solvent manufactured by U.S.I., a large textile company has been successful in speeding up two pressing operations in its processes by as much as 100%, as well as in improving its product.

In both instances, the application of Solox is new and arose out of efforts on the part of production men to find a solvent which would be inexpensive, have a favorable evaporation rate, and leave no objectionable odor. Solox was found to meet all requirements.

Cuts Time in Half

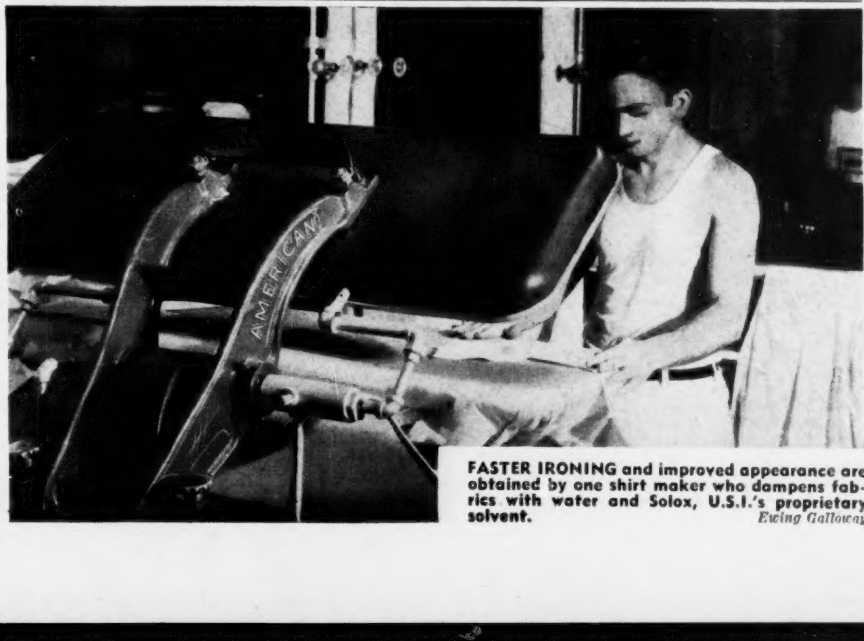
In one of the operations, a mixture of equal parts of Solox and water is sprayed, with an automatic spray gun, on goods such as pajamas preparatory to pressing them for market. With the Solox mixture it is easy to get a sharp crease and the operation takes less than half the time when water alone is used.

The other pressing operation involves the use of a mixture of 25% Solox and 75% water (in some cases 50% Solox and 50% water) for ironing collars lined with "dry" linings instead of the acetate type of interlayer.

It is claimed that the use of Solox with "dry" linings not only produces a good crease but raises the adhesion of the fabric layers from about 2 pounds to between 4½ and 5 pounds—a figure which is more than enough to eliminate all blisterings. The immersion time in Solox solution may vary from 4 to 15 seconds.

Applications of Solox in the textile field are not limited to the above. Recent information indicates that Solox added to vat dyes will promote good penetration and level dyeings. A recently announced dry cleaning fluid, easily and quickly purified, specifies the use of a solvent identical in composition to Solox.

U.S.I. will be glad to supply interested manufacturers with complete information on the advantages of Solox in the textile and other fields.



FASTER IRONING and improved appearance are obtained by one shirt maker who dampens fabrics with water and Solox, U.S.I.'s proprietary solvent. *Ewing Galloway*

February ★ SOLVENT NEWS ★ 1939

Says Hydrolysis Of Ethyl Lactate Much Less Than Supposed

HANOVER, Germany—The hydrolysis of Ethyl Lactate is considerably less than previous studies have indicated, and may even be, in some cases, negligible, according to a new series of experiments reported here in *Farbe & Lack.*

Tests in which Ethyl Lactate was boiled with large excesses of water indicate only partial hydrolysis, and when the amount of water is 10% or less, this hydrolysis is small enough to ignore, the author asserts.

Likewise, solutions of Ethyl Lactate with as much as 20% water (plus enough alcohol to make the solutions clear) do not show any noticeable hydrolysis when examined for acid number at regular intervals over a period of two months, he adds.

His tests, he says, also indicate that Ethyl Lactate is non-livering with zinc oxide as well as stable to metallic powders.

Ethyl Lactate has the molecular structure of both an alcohol and an ester. Further information regarding its applications may be secured by writing to U.S.I.

20 Groups Of Authorized S.D. Uses In New System

(Continued from preceding page)

Each authorized use bears a code number "that should be used in reporting the use of specially denatured alcohol in part 2 of Form 1482." The code numbers run from 011 to 810, although the numbers are not all consecutive.

Typical of the broad, general headings employed is "Solvent in lacquers and varnishes, etc." Under this the following subheadings appear:

011—Cellulose compound lacquers
012—Synthetic resin varnishes
013—Shellac varnish
014—Spirit varnish
015—Candy glazes
016—Other surface coating materials

Fourteen other general headings are provided for:

021-022: Solvent in manufacturing plastics
031-036: Solvent in manufacturing other cellulose and resinous materials
041-042: Solvents and thinners
051-053: Solvent in manufacturing polishes, inks and stains
111-132: Solvent in the manufacture of toilet preparations and disinfectants
141-142: Solvent in manufacturing toilet soaps
210-244: Solvent in manufacturing external pharmaceuticals
311-315: Solvent for chemical manufacturing and purification
320-359: Extraction, precipitation, crystallization
361-369: Vehice for chemical reaction in manufacturing
410-485: Solvent for manufacturing miscellaneous products
511-579: Raw material in manufacturing chemicals
611-630: Fuel purposes
810: Laboratory and experimental purposes

According to Treasury Department statistics, withdrawals against the eight revoked S.D. formulas in the fiscal year ended June 30, 1937, were as follows:

Formula	Wine gallons
5	*
23	885
23B	199
23C	4,115
23D	51
33A	*
41	2,036
43	50

*Not reported in 1937

No inconvenience to the trade is expected to result from the revocation of these formulas since others are available for the purposes.

The revised Appendix also contains specifications for all denaturants now in force.

Report New Record Sale Of Domestic Tung Oil

GAINESVILLE, Fla.—What is believed to be the largest sale of domestic tung oil on record has been consummated by a producer here, an authoritative report states.

The transaction is said to provide for delivery of 300,000 pounds of tung oil in seven carload shipments. The producer is preparing to set out 400,000 young nursery trees, according to the report.

Sawdust, Soda Smothers Fires In Heavy Liquids

TORONTO, Canada—For smothering fires caused by heavy inflammable liquids, a mixture of sawdust and soda (10 pounds of sodium bicarbonate to one bushel of sawdust) is particularly effective, according to the *Canadian Safety Bulletin.*

It is suggested that the mixture be stored in suitable bins. The addition of 1 pound of talc to the bicarbonate is said to help keep the mixture smooth flowing and resistant to moisture.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Wet surfaces can be painted without lifting or blistering of the film by using new paints available for the purpose, according to a recent announcement. Applied to either wood, metal or concrete, the paints (and varnishes) are said to convert moisture into compounds which rise to the surface of the paint film and evaporate. **(No. 180)**

U S I

An adhesive with acoustical properties and resistant to water, heat and fire is announced available. The material, it is said, has been used in cementing sound-proofing material to airplane interiors. It is 20% lighter than conventional adhesives and may be applied with brush or spray gun, the manufacturer states. **(No. 181)**

U S I

"Liquid sandpaper," a clear, non-abrasive liquid which when wiped on old glossy, enameled or varnished surfaces is said to eliminate the need for washing and sanding before refinishing. The product removes wax, grease and polish without leaving any caustic residue and creates a temporary tack to which the new finish anchors, it is said. **(No. 182)**

U S I

A corrosion inhibitor for industrial water systems is said to form films which adhere tenaciously to iron and steel surfaces. Water treated with this organic product does not attack or stain paint finishes nor cause "chrome itch," reports state. **(No. 183)**

U S I

A scuff-proof spirit label varnish which does not powder when two varnished surfaces are rubbed together and which is non-inflammable, was announced recently. A special adhesive for bonding labels over the varnished surfaces is available, the manufacturer reports. **(No. 184)**

U S I

For fireproofing balsa wood floors, a new paint was recently manufactured. Reports from the manufacturer states that wood treated will merely char slightly. **(No. 185)**

U S I

Instantaneous indication of the rate of flow and the total flow of solvents, oils, varnishes, etc., is provided by a new integrating meter which requires no connection to an outside power source, the maker announces. **(No. 186)**

U S I

A new wood preservative, available either as a penetrating finish or a wax finish, fills wood cells with toughening resins and life imparting oils which keep out moisture and resist germs, molds and wood destroyers, a recent announcement states. **(No. 187)**

U S I

A new Derris concentrate (with or without rotenone) suitable for use in kerosene type contact insecticides, is now available. By the use of this concentrate, savings up to 60% in the cost of active ingredients are claimed. **(No. 188)**

U S I

Blueprints from pencil drawings are possible with a new paper similar in appearance to the well-known blue tracing cloth but which "takes" pencil work, according to the manufacturer. Glass-like transparency and velvety surface are combined in a paper able to withstand hard usage, it is stated. **(No. 189)**

U.S. INDUSTRIAL CHEMICALS, INC.
60 EAST 42ND ST., N.Y. U.S.I. BRANCHES IN ALL PRINCIPAL CITIES
A SUBSIDIARY OF U. S. INDUSTRIAL ALCOHOL CO.

ALCOHOLS
Amyl Alcohol
Butyl Alcohol
Fusel Oil—Refined
Isopropyl Alcohol
Methanol

Ethyl Alcohol
Anhydrous
Absolute
C. P. 96%
Pure (190 proof)
Specially Denatured
Completely Denatured
U. S. I. (Denatured Alcohol Anti-freeze)
*Super Pyro Anti-freeze
*Solox Proprietary Solvent

***ANSOLS**
Ansol M
Ansol PR

ETHERS
Ethyl Ether
Ethyl Ether Absolute—A.C.S.

KETONES
Acetone, C.P.
Methyl Acetone

INTERMEDIATES
Acetoacetanilid
Acetoacet-o-chloranilid
Acetoacet-o-toluidid
Ethyl Acetoacetate
Para-chlor-o-nitraniline
Sodium Ethyl Oxalacetate

ESTERS, ACETATES
Acetic Ether
Amyl Acetate
Butyl Acetate
Ethyl Acetate
Isopropyl Acetate

ESTERS, PHTHALATES
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate

ESTERS, ETHYL
*Diatol
Diethyl Carbonate
Diethyl Maleate
Diethyl Oxalate
Ethyl Chlorocarbonate
Ethyl Formate
Ethyl Lactate

ESTERS, BUTYL
Butyl Propionate
Dibutyl Maleate
Dibutyl Oxalate

OTHER ESTERS
Amyl Propionate
Dimethyl Maleate

OTHER PRODUCTS
Collodions
*Curbay Binders
*Curbay X (Dried Curbay)
Ethylene
Nitrocellulose Solutions
Potash, Agricultural
Urethane

*Registered Trade Mark

Pigments and Fillers

Greater Interest Displayed In Raw Paint Materials

Paint Manufacturers Bullish On Spring Season Outlook—Fair Demand For Lead Pigments—English Vermilion Declines—Varnish Gums Weak—Zinc Sulfide Reduced ½c—

The markets for raw paint materials gave definite indication in the past month that coatings manufacturers are extremely bullish on the spring outlook. Shipments of raw materials against existing contracts were in encouraging volume and spot sales were above the average. The building outlook over the next 6 months is such that producers of paint materials are looking for sharp increases in the demand for their products. In addition, the producers of coatings for the automotive industry look for a very satisfactory first 6 months in '39.

Price stability characterized the market for raw materials last month. A reduction of ½c was made in the schedule for zinc sulfide. The bag price, in carlots, delivered, is now 7⅞c. There is a ½c differential for barrel packing. The feature of the dry colors was, however, a 12c decline in English vermilion, followed a week later by an advance of 4c, making a net loss of 8c. The new schedule is as follows: 500 lbs. or more, barrels, $1.42 per lb.; smaller quantities, $1.43 to $1.56 per lb.

There was very little interest displayed in the natural varnish gums in the past month. Importers were not able to arouse much buying enthusiasm and even withdrawals against existing contracts were not up to expectations. Reductions were made in various types of copal gums, Singapore dammars, bold Batu scraped, and Pontianak chips. Several of the important solvents were reduced in price and these changes are reported in detail on the Solvents and Plasticizers markets page. After a great deal of delay, the producers of synthetic resins finally announced early in January that they would accept business for the first quarter of '39 at levels unchanged from the closing prices of '38.

The lead pigments were in fair demand in the past 30 days and the price structure remained firm and unchanged. Lithopone, the titanium pigments, and the zinc oxides moved out in satisfactory volume for this period of the year with prices steady. There was no basic change in the situation in carbon black. At the price level now existing there is little or no profit to the producers.

November Paint Sales Up

November sales of paints, varnish, lacquer, and fillers by 680 establishments, as reported by the Bureau of the Census, totaled $26,253,314, as compared with $26,105,315 in November of '37. Total for first 11 months reached $326,400,788, as against $399,755,254 in the like period of '37. November trade sales were reported at $13,183,545, compared with $12,790,654 in the corresponding month of the previous year. A comparison of industrial sales follows:—

	Total	Paint & Varnish	Lacquer
Nov. '38..	$10,638,281	$6,950,589	$3,687,692
Nov. '37..	10,889,719	7,169,000	3,720,719

December Construction at Peak

Construction contract total for '38, $3,196,928,000, was the highest since '30, and was 10% above '37 volume. Not since '28 has any December total of construction contracts awarded equaled that of December, '38. The contract record for last month amounted to $389,439,000, a gain of 86% over December, '37, and an increase of 29% over November, '38.

Somers Forms Company

The Somers Color & Pigment Co., 41 E. 42nd st., N. Y. City, has been formed by Andrew L. Somers, former president of the Fred. L. Lavanburg Co., Brooklyn. Andrew L. Somers is the son of the late Arthur S. Somers, who as president of the Lavanburg company contributed so much to the paint industry, and is Congressman from the 6th N. Y. District. The new company plans to manufacture a complete line of pigments.

Weismann Joins S & W

In line with its new program of expansion, Stroock & Wittenberg Corp., 17 Battery pl., N. Y. City, announces appointment of W. A. Weismann to the sales staff. Mr. Weismann is well known in the surface coating field, having for many years been associated with Spencer Kellogg & Sons and more recently with L. N. Jackson Co., Inc. Mr. Weismann's intimate knowledge of oils and the resins used therewith and his familiarity with actual manufacturing needs as they exist in many plants throughout the country, provide the background to enable him properly to present to the trade the Stroock & Wittenberg synthetic and natural resins and their pertinent developments.

Weller Forms Company

Walter C. Weller, formerly New England representative for Wishnick-Tumpeer, Inc., has organized the Weller Chemical Co., 141 Milk st., Boston. Company will act as distributor for a number of manufacturers, including producers of carbon black, sulfur, colors, fillers, etc.

Zang Now Sales Manager

J. A. Zang, former assistant sales manager of the white-lead division of National Lead's Atlantic branch, has been appointed sales manager. W. F. Hurley has been appointed assistant sales manager.

Important Price Changes

ADVANCED

	Jan. 31	Dec. 31
None		

DECLINED

	Jan. 31	Dec. 31
Red vermilion	$1.42	$1.50
Zinc sulfide, bags	.07⅞	.08⅜

Jacob Bloch Retires

After a career of nearly half a century as a seller of colors in the Chicago district, Jacob Bloch retires from the Lavanburg sales organization. Sales in the Chicago area are now supervised by George E. Cortiss, who has worked in the Chicago territory for the past 12 years.

Organization of a nationwide sales staff has not yet been completed and the following is only a partial list of the Lavanburg sales agents and representatives for '39.

Boston: N. S. Wilson & Sons, 150 Causeway st.; Chicago: George E. Cortiss, 7040 Calumet ave.; Cincinnati: William J. Deeks, 717 First National Bank Bldg.; Cleveland: R. H. Coerdt, 642 Terminal Tower Bldg.; Illinois (except Chicago): W. W. Klug, 1624 N. 69th st., Wauwatosa, Wisc.; Kansas City: Abner Hood Chemical Co., 507 N. Montgall ave.; Philadelphia: G. A. Olson, 1700 Walnut st.; Pittsburgh: Homer D. Butts, Grant Bldg.; St. Paul: L. A. Moore & Co., 740 Vanalia st.

Reichhold Promotions

At the January meeting of the board of directors, Reichhold Chemicals, Inc. (formerly Beck, Koller & Co.), of Detroit, Mich., promoted 5 of its representatives to managerships of their respective territories.

Newly appointed district managers are G. A. (Gus) Olson, Philadelphia; Wm. J. (Bill) Deeks, Cincinnati; R. H. (Bob) Coerdt, Cleveland; M. W. (Bob) Reece, San Francisco; and F. E. (Frank) Dillon, Los Angeles.

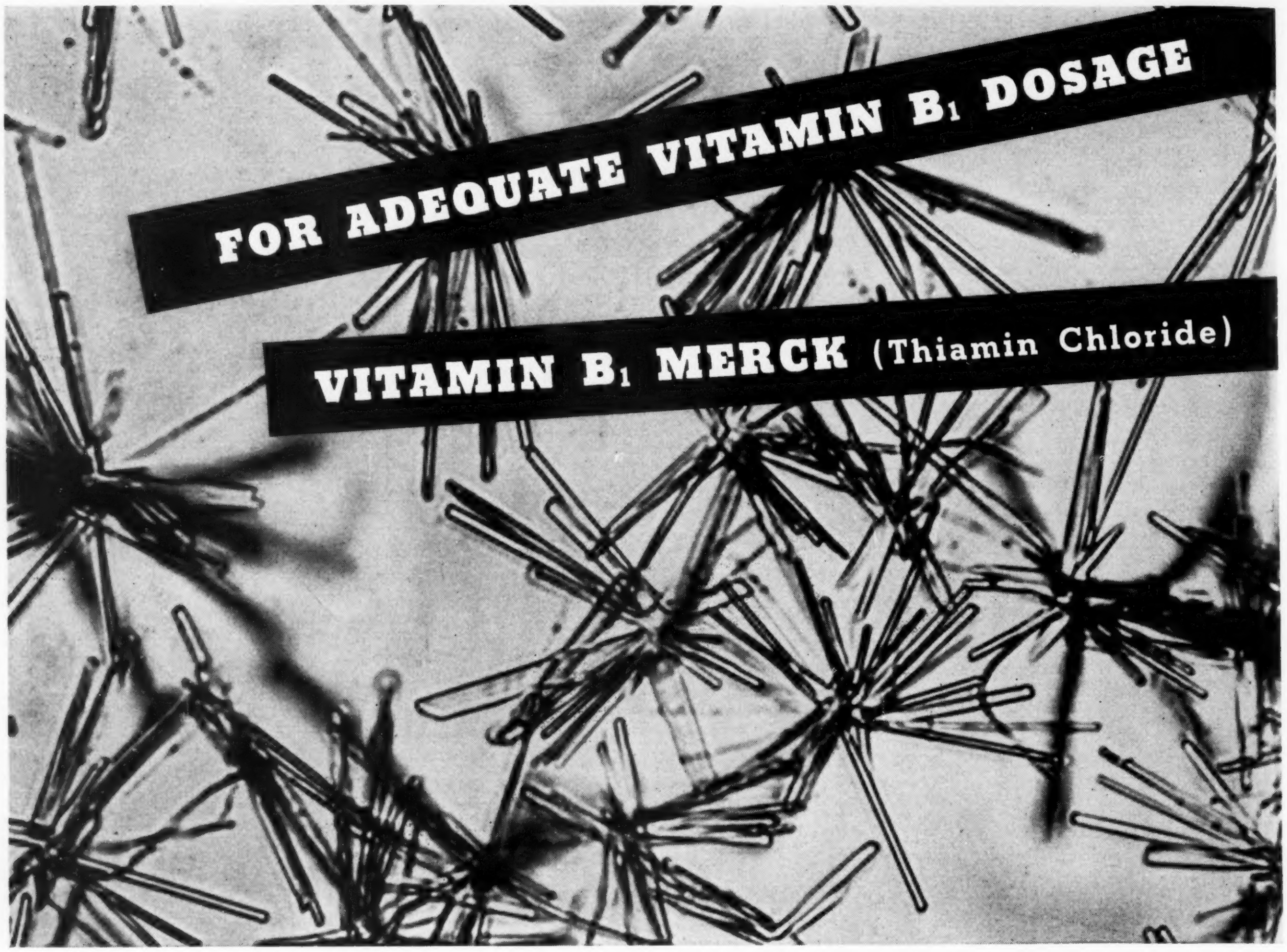
In addition to supervising the sale and distribution of RCI synthetic resins in their respective territories, Messrs. Olson, Deeks, Coerdt, Reece and Dillon will also handle the sale and distribution of the Lavanburg line of chemical pigments in the districts named.

New Supplier of Pails

The Rosenbloom Barrel & Drum Co. has formed a subsidiary, The Chicago Pail Mfg. Co., 3233 W. Grand ave., Chicago, and will manufacture steel pails.

Overmyer Promoted

Dr. C. J. Overmyer, widely known in Chicago paint circles, has been promoted to superintendent of the Chicago plant of Devoe & Raynolds.



PURE CRYSTALLINE VITAMIN B_1 HYDROCHLORIDE

with a Potency of 333,000 International Units per Gram

Minimum Daily Requirements

For Infants—not less than 50 International Units (0.16 mg.).
For Adults—not less than 200 International Units (0.66 mg.).

Therapeutic Dose

To ensure adequate curative dosage in advanced vitamin B_1 deficiency, from 5 to 100 mg. daily, equivalent to approximately 1500 to 30,000 International units, may be required. Later, the dosage may be reduced to 5—10 mg. (1500—3,000 I. U.), three times per day.

Important Indications

Anorexia of Dietary Origin . . . Beriberi . . . Alcoholic Polyneuritis . . . Essential for Optimal Growth of Infants and Children.

May be administered orally or parenterally. Very soluble in water and slightly soluble in alcohol.

Literature on Vitamin B_1 Hydrochloride (Thiamin Chloride Merck) will be mailed on request.

MERCK

MERCK

FINE CHEMICALS FOR THE PROFESSIONS AND INDUSTRY SINCE

★ 1818 ★

MERCK & CO. Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

New York • Philadelphia • St. Louis • *In Canada:* Merck & Co. Ltd., Montreal and Toronto

Fine Chemicals

Mercury Turns Sharply Higher

Good Inquiry For Seasonal Items—Citric Acid Reduced 1c—Rochelle Salt and Seidlitz Mixture Advanced—Agar Firmer—Glycerine Unchanged—Routine Trading in Aromatics—

An excellent demand for such seasonal items as acetylsalicylic acid, codeine, morphine, guaiacol, certain of the bromides, camphor, acetphenetidin, and acetanilide was reported by producers. With the inventory period out of the way, buyers showed a decided willingness to place a conservative amount of business. The total volume for the month was slightly above that for December and considerably larger than that for January a year ago.

At the close of the period under review mercury took a decided bullish turn and domestic metal was advanced to $80 per flask. A substantial volume of business is said to have been booked at this figure. The mercurials have taken on a much firmer appearance, although no price revisions have been announced.

Citric acid was reduced 1c per lb. in the past month. Crystals are now quoted at 21¼c in 10,000 lb. lots, one shipment; carlots at 21c; and smaller quantities at 22c. Demand was seasonally light. With the acid lower, a decline was made in sodium citrate.

Rochelle salt and Seidlitz mixture were advanced in price, indicating the strong price position for the tartars. Rochelle salt was "upped" 1c. On the new basis crystals are quoted at 18¾c in 5,000 lb. lots, one delivery, while smaller quantities are priced at 19¼c. Powder is quoted 1c lower than crystals. The advance in Seidlitz mixture amounted to ¾c per lb. The 5,000 lb., one shipment price is 14⅝c, while smaller quantities are quoted at 15⅛c. A differential of ½c is made for keg packing.

Agar prices were advanced in the middle of the month despite very light demand. Many importers and large buyers were holding aloof from the market awaiting additional developments on the new crop shipments which are largely made in January-February.

Cadmium Reduced to 80c

Other price changes included a 5c decline in the metal cadmium to a basis of 80c per lb.; a 1c drop in tablet camphor; and a 3c reduction in the technical grade of hexamethylenetetramine and an 8c reduction in the U. S. P. material. In the face of light trading, further weakness developed in the market for natural menthol and two separate reductions of 5c each brought the current price down to $3.00 per lb. A 1c decline was made in pure ethyl alcohol and in the completely and specially denatured grades. Glycerine prices abroad have taken on a slightly firmer tone and this has had a bullish effect on prices here, although no change in the schedule has been made.

The metal bismuth and its salts continued firm and unchanged. An excellent demand for U.S.P. ammonium chloride and sodium and potassium bromides was reported. Tartaric acid remained unchanged in price, but because of the advances in Rochelle salt and Seidlitz mixture, buyers of tartars are keeping their eyes and ears to the ground for possible indications of higher quotations in the near future.

The call for essential oils and aromatic chemicals in the past month was generally satisfactory for that period of the year. While individual orders were generally not large, the total volume compared very favorably with any of the past few months and was considerably ahead of the same month a year ago. In the aromatic chemicals the principal price change was a 20c decline in phenylethyl alcohol. Considerable competition was said to have existed in the market for methyl cinnamate, with the price down to $1.85-$2, depending upon quantity.

Important Price Changes

	Jan. 31	Dec. 31
ADVANCED		
Agar No. 1	$0.93	$0.90
No. 3	.68	.63
Mercury	80.00	77.00
Rochelle salt	.18¾	.17¾
Seidlitz mixture	.14⅝	.13⅞
DECLINED		
Acid citric	$0.21	$0.22
Alcohol, phenylethyl	2.50	2.70
Cadmium (metal)	.80	.85
Camphor (nat.) tablets	.55	.56
Hexamethylenetetramine, tech.	.32	.35
U. S. P.	.38	.46
Menthol (nat.)	3.00	3.10
Sodium citrate, U. S. P. VIII	.18½	.19½
U. S. P. XI	.24	.26

Baker Holds Sales Convention

The annual sales convention of the J. T. Baker Chemical Co. was held Jan. 20-22 at the Hotel Easton, Easton, Pa., under the general direction of Ralph Clark, general sales manager. The group was welcomed by Herbert H. Garis, president.

Personals

Annual award of the Pittsburgh Section of the A. C. S. will be made to George Hubbard Clapp at a meeting on Feb. 16. Each year award is made in recognition of outstanding service to chemistry in the Pittsburgh district.

Mr. Clapp, who recently celebrated his 80th birthday, was instrumental in bringing to Pittsburgh Charles M. Hall and in organizing the Pittsburgh Reduction Co., which is now the Aluminum Co. of America. He was first president of the Scientific Materials Co., now the Fisher Scientific Co.

Pierre S. du Pont is now on the board of the Pittsburgh, Cincinnati, Chicago and St. Louis Railroad, lifting the number of his directorships to 90.

Dr. Ross A. Baker, professor of chemistry at C. C. N. Y., received one of the 3 fellowships presented by The American Institute of the City of New York at the annual dinner held at the Pierre on Feb. 2. Fellowship was awarded to Dr. Baker "for the promotion of better teaching and evidence of deep appreciation of the problems of our students in colleges."

At a meeting of the directors of The N. Y. State Society of Professional Engineers, Irving Hochstadter of the chemical engineering firm of Stillman & Van Siclen, was elected the director to represent the N. Y. State Society in the National Society of Professional Engineers.

Personnel

James H. Critchett and Francis B. Morgan have been elected vice-presidents of Electro Metallurgical, a unit of Union Carbide and Carbon, N. Y. City. Mr. Critchett has been in charge of research work, and Mr. Morgan has been works manager for this company.

E. E. LeVan has been elected vice-president of Haynes Stellite, a unit of Union Carbide. Mr. LeVan has been general sales manager and is located at the company's general office and works at Kokomo, Ind.

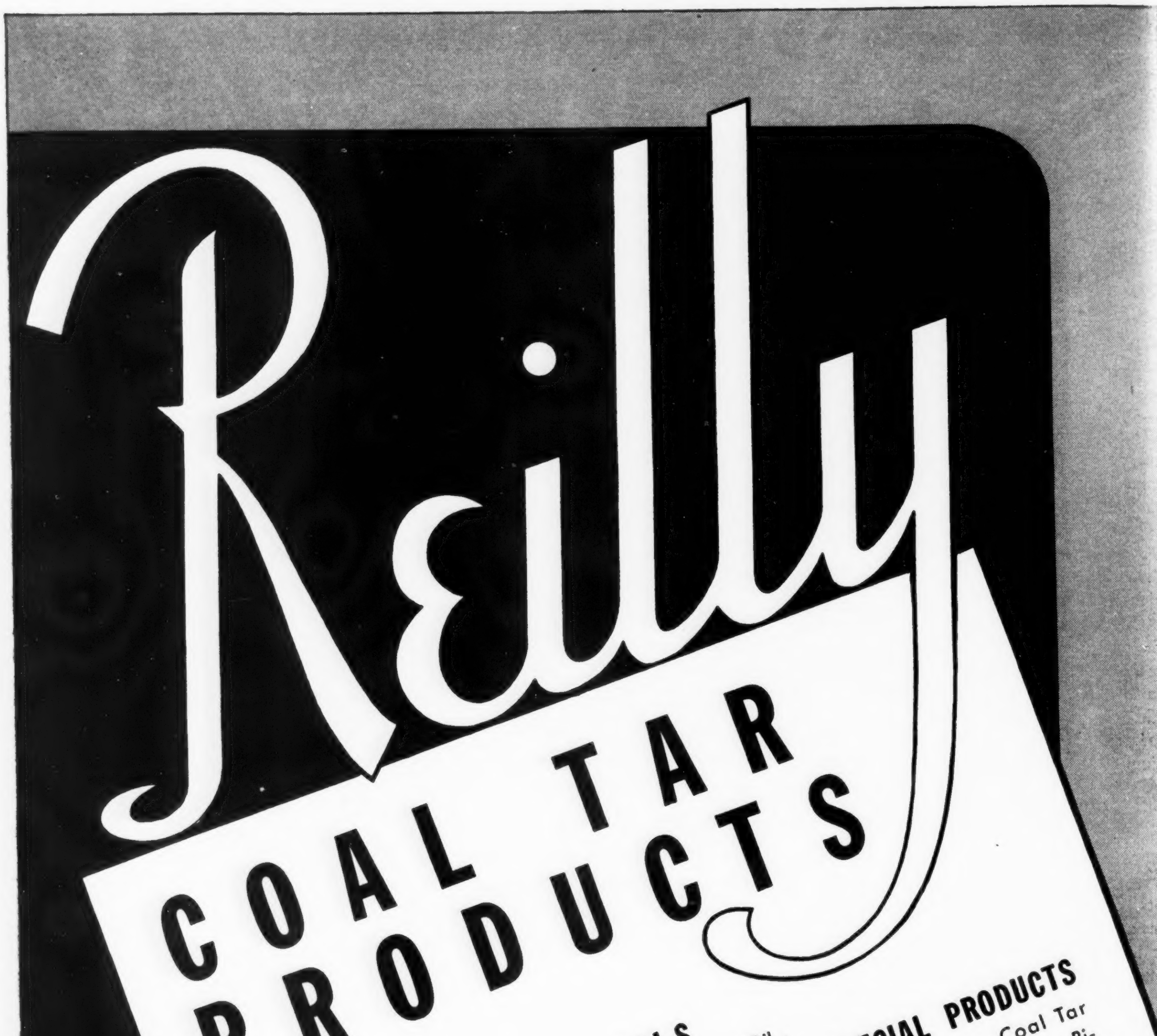
Edward G. Egan, well-known in the chemical field, joins the staff of Charles Hardy, Inc., 415 Lexington ave., N. Y. City, as chemical salesman.

E. Budd Marter, formerly assistant manager in the Philadelphia area for Archer-Daniels-Midland and Werner G. Smith companies, has joined the Murray Oil Products Co., Philadelphia, as assistant sales manager.

Verner A. McCullough has been promoted to assistant engineer of the technical service division on dry cleaning sales of Darco Sales and is now stationed at the N. Y. office of the company.

Lea—Cyanide Distributor

The Lea Mfg. Co., Waterbury, Conn., is now a distributor of industrial cyanides for American Cyanamid & Chemical.


Reilly
COAL TAR
PRODUCTS
ACIDS
Phenol . Ortho Cresol . Cresol U. S. P. . Cresylic Acid . Meta Para Cresol . Xylenol . High Boiling Tar Acids.
OILS
Neutral Oil . Tar Acid Oil . Light Oil . Creosote Oil . Coal Tar Oil . Brushing Oil.
SPECIAL PRODUCTS
Carbon Coke . Coal Tar Paints . Coal Tar Pitch . Bituvia Road Tar . Flotation Oils . Pipe Coating . Transote . Roofing Felt, Pitch, Tar.
CHEMICALS
Acenaphthene . Anthracene . Carbazole . Fluorene . Methyl Naphthalene . Phenanthrene . Naphthalene.
INDUR PLASTICS
Insulating Varnish . Laminating Varnish . Molding Powder . Molding Resin.
REILLY TAR & CHEMICAL CORPORATION
Executive Offices: Merchants Bank Building, Indianapolis, Indiana
2513 S. DAMEN AVE., CHICAGO, ILLINOIS
500 FIFTH AVE., NEW YORK, N.Y.
ST. LOUIS PARK, MINNEAPOLIS, MINN.

Imported Crude Naphthalene At Lower Levels

Satisfactory Demand For Coal-Tar Solvents—Phenol Shipments In Better Volume—Benzol Steady—Increase In Dye Sales—Intermediates Firm—Gain in Coking Operations—

Coal-tar Chemicals

A good demand was evidenced for most of the coal-tar chemicals in the past 30 days. With the year-end inventory period out of the way, buyers entered the market with sizable orders. The shipments of coal-tar solvents were quite satisfactory. The temporary February let-down in the automotive centers is not expected to be quite as pronounced as was earlier expected, with the result that coatings manufacturers are quite active.

The movement of refined naphthalene into jobbers' hands has started. The price structure of refined material is one of firmness, but fresh weakness developed in the imported crude. Two price declines were made in the past month, one of 10c and the other of 15c, bringing the price level down to $1.60 per 100 lbs. No change was made in the quotation for domestic crude.

The market for benzol was steady throughout the period under review. Consumers came into the market at fairly regular intervals. Prices were firm and unchanged. The gradual increase in coking operations over the past few months has eased considerably the scarcity of benzol stocks in certain parts of the country. Synthetic resin and plastic molding powder manufacturers have increased their takings of phenol. A fair inquiry for cresylic acid was noted. The competitive position between domestic and imported continues without much change, but in the past month no price revisions were made.

Stocks of pyridine are none too plentiful and prices are extremely firm at the higher levels recently established. The shipments of creosote oil, tar acid oil, and the cresols were moderate. Interest in most of the coal-tar intermediates expanded and the same statement is true of most of the coal-tar acids. Dye manufacturers have increased production schedules in anticipation of good sales to the consuming fields, particularly textiles and leather. Dye sales in the past month were in much better volume than in either December or January of '38 and just about approached the November '38 sales level.

Coking Operations Expand

Activity in the coke industry was at the highest level attained during '38, and represented the 6th consecutive advance over the preceding month. Production of by-product coke for the 31 days of December was 3,362,845 tons, or 108,479 tons per day. In comparison with November, the daily rate dropped 0.7%, but was 19.1% above the rate obtained in December of '37. Benzol production in December reached 7,802,000 gals., a gain of 2.4% over the November volume of 7,619,000 gals. Production in December of '37 amounted to only 6,340,000 gals. Production of benzol dropped 39% in '38 from the '37 total, the respective figures being 71,362,000 gals. and 117,014,000 gals.

Preliminary figures for '38 indicate a production of 389,500,000 gals. of tar; 120,800,000 gals. of crude light oil; and 39,400,000 lbs. of naphthalene.

Gere Forms New Company

Rollin C. Gere has formed the Coopers' Creek Chemical Corp., to take over the old Coopers' Creek Chemical Co., Conshohocken, Pa. John B. Bowman is secretary of the new company. Both men were previously associated with Sloane Blabon Corp., a Certainteed Products' subsidiary.

Distributor of "Furson"

E. Sonnenschein & Co., 276 5th ave., N. Y. City, jobber of chemicals, has been appointed sole distributor of "Furson" (para-phenylenediamine). Stocks are maintained in N. Y. City, New Jersey and in the midwest for prompt deliveries.

Important Price Changes

	Jan. 31	Dec. 31
ADVANCED		
None		
DECLINED		
Naphthalene, crude, imp.	$1.60	$1.85

Obituaries

Charles Edward Kelly, 42, senior partner of Hagerty Bros. & Co., N. Y. City wholesale glass container concern, died suddenly on Jan. 19, after an operation for a ruptured appendix performed on Jan. 15. But a few days before being stricken, Mr. Kelly retired as president of the Chemical Salesmen's Association, presiding at a luncheon at which the new officers were elected. He was chairman of the Drug, Chemical and Allied Section of the N. Y. Board of Trade at the time of his death.

CHARLES EDWARD KELLY

Mr. Kelly was born in Brooklyn, and was graduated from St. Peter's College, Jersey City, N. J., in '17. After serving in the World War, he joined the firm of Hagerty Bros. & Co., which his father, James E. Kelly, had founded. On his father's death in '34, he became the senior partner. Mr. Kelly was president of the Alumni Association of St. Peter's College.

He is survived by his widow, 4 daughters, his mother and a brother, Joseph F. Kelly, who is a member of the Hagerty firm.

William N. Barnum

William N. Barnum, 50, treasurer and director of R. W. Greeff & Co., N. Y. City, on Jan. 17, after a brief illness. A graduate from Amherst in '11, he became associated with the dry color firm of Frederick H. Levey & Co., and in '15 joined the Greeff organization. He served as a naval aviator during the World War. Surviving are his wife, a son and daughter.

William Longfelder

William Longfelder, 66, vice-president and general sales manager of the laundry division of H. Kohnstamm & Co., on Jan. 5. Mr. Longfelder resided in Nutley, N. J., for 44 years and was prominent in local affairs. During the World War he served in Washington as a dollar-a-year man.

Herman B. Van Cleve

Herman B. Van Cleve, 78, vice-president, Interstate Chemical Manufacturing Co., Jersey City, N. J., on Jan. 6, at his home in Montclair. He is survived by his widow, two sons, two daughters, and two sisters.

Other Deaths of the Month

Oscar Werber, 52, owner of the Xenia Fertilizer & Tankage Co., Xenia, Ohio, on Dec. 29. . . . Roland T. Will, 53, founder of the Will Corporation, Rochester, N. Y., on Jan. 3, following several years of ill health. . . . Prof. Herbert J. Baker, director of the State Agricultural Extension Service at Rutgers, on Jan. 6, following a heart attack. . . . John Nelson Dick, vice-president of the Philadelphia firm of Montgomery Brothers, on Jan. 18. He was also a well-known attorney.

New Conversion Unit

Monsanto will construct a new $250,000 phosphoric acid conversion unit at its plant at Monsanto, Ill.

Natural Raw Materials

Light Trading Reported In Raw Materials

Buyers Continue "Hand-To-Mouth" Purchasing Policy—Egg Products Decline—Myrobalan Extract Competitive—Higher Quotations for Japan Wax—Shellac Market Quiet—

The political developments abroad of the past few weeks exerted a very definite bearish action on sizable buying of natural raw materials. Consumers appear to be content to limit purchases to immediate needs until such time as conditions show likelihood of appreciable improvement. As the result, transactions in the markets for natural dyestuffs, natural tanstuffs, natural gums and waxes, etc., were, for the most part, of a routine nature. The total volume for the month compared favorably with October and November of '38 and exceeded by a comfortable margin the volume in January a year ago. Buyers were in the market more often, but usually for small replacement lots.

The reduction in shell egg prices was the direct cause for spot quotations on domestic egg yolk being lowered 2c, to a basis of 65-67c. Domestic egg albumen was also available at concessions. Crystal material was lowered 2c and the new price range is 73-75c per lb. Powdered material was off 3c, to a basis of 77-85c, according to quality and quantity. Imported material declined in sympathy with the domestic grade. It has been reported that government officials and egg producers are to meet soon in an effort to find ways and means of stabilizing the market.

The decline in quotations for myrobalan extract, solid and powdered material, is of special significance. The lower import duty on the item under the new reciprocal trade agreement with Great Britain has forced domestic producers to meet foreign competition. The price movement in the natural tanstuffs was mixed—slightly higher prices were in evidence for mangrove bark, myrobalans, J1, and wattle bark, while quotations were lowered on ground sumac and leaf sumac. Quotations for the natural dyestuffs, such as annatto, cochineal, fustic, logwood, and tumeric were firm and unchanged.

All of the corn derivatives were slightly higher in the past 30 days. Buying was only routine, however, for consumers were for the most part able to anticipate their needs before the most recent advance was placed in effect.

Japan Wax Advanced ¾c

A fairly active wax market was reported in the past month. Cables from Japan reported a ¾c advance in price for Japan wax and also revealed that the Japanese Government was now exercising full control over prices. Spot quotations at the month-end were 10¼-10½c per lb., according to the quantity and the seller. Carnauba prices turned decidedly soft last month and spot stocks were offered at important concessions. There seems to be more than just rumor to the reports that the syndicate of Brazilian shippers has broken up.

Shellac Prices Hold

A fair movement of shellac into consuming channels was reported by the leading suppliers. Prices were firmly held at previous levels. The trade was quite concerned with rumors that the Indian Government was about to fix minimum prices in the Calcutta market, but in most well-informed quarters here this rumor was discounted as propaganda.

Rosin, Turpentine Quiet

Purchasing of naval stores in the past 30 days was largely of a routine, replacement character. Movement of material against contracts was generally satisfactory, but new business was spotty. Buyers, of course, are holding off to see or hear an authoritative statement on the matter of financing production and marketing operations during the coming season. According to rumors in Southern primary centers, the full amount ($20,-000,000) necessary to cover the entire season will be made available. It is also reported that present plans call for a curtailment of some 100,000 to 150,000 units in the '39-'40 season.

New China Clay Plant

The newly-established plant of Canada China Clay, Ltd., near Lac Remi, Quebec, will start production about April 1. It is expected that most of the company's output will go into fine paper making.

Mackay, of Penick, Dies

George S. Mackay, 72, one of the most widely known and highly regarded men in the botanical drug trade and mid-western representative for S. B. Penick & Co., crude drug importer and exporter, N. Y. City, died Jan. 17 in Detroit, Mich.

Olsen Discusses "Pectins"

"Pectins, Their Preparation, Properties, and Uses," was the subject of Dr. A. G. Olsen, research department, General Foods Corp., speaker at the January 9 meeting of the Midwest Section of the American Association of Cereal Chemists, held in the Board of Trade Bldg., Chicago. Sixty were present. J. Paul Bishop, Corn Products Refining, presided.

TAPPI Aids Research

TAPPI has given the N. Y. State College of Forestry at Syracuse University a grant of $1,000 for the support of research on "The Relation of Lignin Content to the Strength of Paper and Pressed Boards."

Important Price Changes

	Jan. 31	Dec. 31
ADVANCED		
Corn sugar, tanners	$3.09	$3.05
Dextrin, corn	3.50	3.40
British gum	3.75	3.65
Gum thus	14.50	14.00
Mangrove bark	23.25	23.00
Myrobalans J1	25.00	24.00
Starch, corn, pearl	2.60	2.50
powdered	2.70	2.60
Wattle Bark	36.50	36.00
Wax Japan	.10¼	.09¾
DECLINED		
Egg albumen, dom. cryst.	$0.73	$0.75
dom. powdered	.77	.80
Egg yolk	.65	.67
Gum East India, Batu bold scraped	.05	.05¼
black, bold, scraped	.06⅜	.06⅝
nubs and chips	.04½	.04¾
Gum, East India Singapore, Rasak, chips	.06	.06½
Gum East India Singapore, dust	.05	.05⅛
Gum Pontianak, chips	.07¾	.08¼
Gum Gamboge, pipe	.55	.60
powdered	60	.65
Gum Tragacanth, No. 1	2.25	2.60
Myrobalan extract, solid	.04¼	.04⅜
powdered	.05	.05⅜
Sumac, ground	66.00	67.00
leaf	70.00	73.00
Wax, Carnauba, No. 1 yellow	.37½	.39
No. 2 yellow	.36½	.38
refined	.33½	.35
Wax Spermaceti	.18	.22

Esselen Speaks In Charleston

Dr. Gustave Esselen, Boston consultant, was the guest speaker at the Jan. 5 meeting of the Kanawha Valley Section of the A. C. S. His subject was, "Bubble Formation as Revealed by Ultra Slow Motion Photography."

At the meeting Dr. T. W. Bartram, Monsanto Chemical, was elected chairman to succeed H. L. Cox. The other officers named are:—Vice-chairman, W. T. Nichols, Westvaco; secretary, Dr. C. M. Blair, Carbide; councilors, B. H. Jacobson, Ohio-Apex; Dr. G. A. Perkins, Carbide.

Ostromislensky Dies Suddenly

Dr. Iwan I. Ostromislensky, a pioneer in the development of synthetic rubber, on Jan. 17, of angina pectoris. He came to this country in '21 at the request of U. S. Rubber, after he had fled from Russia to Riga, to pursue his research on rubber and on a process of vulcanization without the use of sulfur. In '26 he opened his own consulting laboratories.

Paint Sales Promotion Plans

The paint division of Pittsburgh Plate Glass reports the doubling of the advertising budget for '39. A 20% increase in sales was predicted at the division's annual sales meeting. Devoe & Raynolds' appropriation is equal to that of last year.

Raw Fertilizer Materials Continue Dull

Southern Mixers About To Start Active Season—Little Interest In Potashes—Ammonium Sulfate Available In Larger Quantities—Phosphate Materials Quiet—

Agricultural Chemicals

Seasonal slackness continued in the markets for raw fertilizer materials during most of the period under review, but near the month-end definite indications were noticeable that Southern mixers were ready to start in preparation for the heavy consuming season just ahead,

Price changes were relatively few during January. Ground fish scrap in the Baltimore market moved up $2 a ton to a basis of $52-$55 per ton. There was very little demand for the material, but a scarcity of supplies was responsible for the higher asking price. The various organic ammoniates fluctuated rather widely in price. Gains made early in the month were lost in the final week of the month. Hoofmeal at Chicago was advanced 35 points, to the basis of $2.85. Raw bone at Chicago closed at $26 per ton, a net loss of $2 from the December close.

No price changes were made in nitrate of soda or sulfate of ammonia. Suppliers report very little consumer interest in the past month. The steady increase in coking operations in the past 6 months has removed the possibility of any scarcity of sulfate developing in the near future at least. Production at by-product plants in December toitaled 45,837 tons, a gain of 1.9% over the 44,985 tons produced in November. Output in '38 declined 32.3% from the '37 total, the figures being 436,702 and 644,870 tons respectively.

Spot Interest Lacking in Potashes

Interest in agricultural potashes was at a low ebb in the past 30 days. Mixers have already taken what they believe is necessary for their minimum requirements. Besides, many are carrying quite large inventories from the previous fertilizer season. As a result, quiet market conditions are expected for at least 60 days more. Then, if there is a decided improvement in fertilizer consumption outlook, there may be a wave of last-minute purchasing.

In line with the general trend, the phosphate materials were quiet and without any major developments. Trading in superphosphates was of a routine nature, but producers are looking for a decided improvement over the next 30 days. Light demand and firm prices characterized the market for rock.

Of special interest in superphosphate circles were the bids opened last month by the Dept. of Agriculture from 7 companies offering a total of 43,600 tons of concentrated superphosphates. Prices bid ranged from 60½c per unit bulk in Florida to 78½c per unit bagged and delivered at Searsport, Me. Only 5,000 tons of the total offered was of foreign production.

The highly interesting and informative British Sulphate of Ammonia Federation report has been released and is digested in the Statistical and Technical Data Section of this issue. Production increases for the year ended June, '38 are noted for synthetic ammonium sulfate, cyanamid, nitrate of lime, synthetic nitrogen and Chilean nitrate, while declines are shown in the output of by-product ammonium sulfate.

Fertilizer tax tag sales in 17 states in December were equivalent to 219,046 tons, a substantial gain over sales in December, '37. Sales for the entire year were equivalent to 5,263,000 tons, against 5,849,000 tons for the year 1937. A detailed report on tax tag sales will appear in the March issue in the Statistical and Technical Data Section.

Exports, Imports Decline

Totaling 147,587 long tons with a stated valuation of $1,468,947, November exports of fertilizers and fertilizer materials were 3% below November 1937, in tonnage and 25% below in value. Exports of phosphate rock and synthetic sodium nitrate were larger than a year ago, but declines from last year were shown by most other classes of materials. Total shipments for the month were well above November of '36. Fertilizer exports in the first 11 months of the year were 4% larger than in the corresponding period of '37, but were 9% smaller than two years ago.

November imports totaled 114,164 long tons, valued at $2,804,929. Compared with November 1937 there were declines of 24% in tonnage and 25% in value. Practically all of the decline in nitrogenous material imports was accounted for by a sharp drop in nitrate of soda. There was a moderate falling off in potash imports, although a slight rise was shown in muriate. Aggregate import tonnage in the January-November period was somewhat under the same period of '37 and was the same as in '36. Potash imports have been only about half as large as they were in '37.

Royster's Toledo Expansion

F. S. Royster Guano, Norfolk, has purchased a 13-acre tract in Toledo and will use it for factory expansion. The plant manager is W. G. Ellis.

Williams, Fick Now V.-P.'s

Julian Y. Williams and George H. Fick have been e'ected vice-presidents of American Agricultural Chemical, N. Y. City. Mr. Fick will also assume the duties of wholesale manager and Mr. Williams will continue as fertilizer sales manager.

Important Price Changes

	Jan. 31	Dec. 31
ADVANCED		
Blood, dried, dom., N.Y.	$3.30	$3.25
Bonemeal, Chgo.	25.00	24.00
Fish scrap, grd., Balto.	52.00	50.00
Hoofmeal, Chgo.	2.85	2.50
DECLINED		
Blood, high-grade, Chgo.	$3.35	$3.50
Bone, raw	26.00	28.00

Boosts Western Phosphates

Enlarged development of phosphate production in the U. S. coincident with efforts to expand usage of this type of fertilizer were urged Jan. 23 in a report submitted to Congress by a joint committee set up 6 months ago to study this problem.

Committee made 6 recommendations, principal ones involving projected expansion of the facilities of the T. V. A., both in production at its own Muscle Shoals plant and experimental works in Western areas.

"The resources of our government have long been sorely taxed by the economic ills originating from the land," the report stated. "This committee feels that our national policy should now focus upon a central fact: if all the land now destroyed by erosion and overcropping is written off as a loss and no future efforts are made to reclaim it, tremendous additional quantities of phosphate will still be required to prevent our remaining productive lands from going the same way."

Fertilizer Company Briefs

The Nichols Fertilizer Corp. has been formed at Money Point, Va. Company occupies buildings formerly used by Central Chemical Co. The president is W. L. Nichols, active in Norfolk fertilizer circles for 20 years. . . . The Shell Lime Co., Myrtle Beach, S. C., headed by D. T. Bowden, will market lime and fertilizers. . . . Chatham Fertilizer, located at Bay st. and Lathrop ave., Savannah, is new in the field, with George E. Cope as president.

Fertilizer Personals

J. N. Lipscomb has resigned as president of Victor Fertilizer, Chester, S. C., and is succeeded by R. A. Oliphant. . . . Howard F. Kimble, vice-president in charge of the plant of the Smith Agricultural Chemical Co., Indianapolis, has been elected a member of the board.

MEN AT WORK !

THE installation and maintenance of insulated wire is a job depending, to a great degree, upon the labors of skilled, high paid men. Repairs and breakdowns must be kept at a minimum or else operating costs would soon become prohibitive.

This is one of the reasons why specifications covering insulation and fibrous wire coverings are yearly becoming more rigid. Many insulated wire manufacturers have found the solution to their worries by using Starkie Weatherproof and Code Wire Finishes.

The basic material in Starkie wire finishes is a non-toxic synthetic fatty acid pitch. These Starkie synthetic pitches are very much less sticky than stearine or cottonseed pitches of the same consistency, consequently sticky wire can be easily and safely eliminated even in hot summer weather. By the addition of an anti-oxidant Starkie finishes oxidize far more slowly and wire can be stored for long periods without excessive hardening of the finish.

All Starkie Weatherproof and Code Wire Finishes are blended by a special patented process exclusively controlled by the A. E. Starkie Company.

STARKIE WEATHERPROOF AND CODE WIRE FINISHES

"Tailor Made To Your Requirements"

STARKIE BINDER A Pure Synthetic Pitch • ASPHALT • GILSONITE • VEGETABLE OILS • VEGETABLE AND ANIMAL FATTY ACIDS • NAPHTHENIC ACIDS • STEARIC ACID • ASBESTOS FIBRES • CAROB FLOUR • BENTONITE • DIATOMACEOUS EARTH

A. E. STARKIE CO.

1645 S. KILBOURN AVE. CHICAGO, ILLINOIS

Chinawood Declines In Light Trading

Fats and Oils

Declines Outnumber Advances in Leading Fats and Oils—Buyers Hold to Conservative Policy—Refined Fish Oils Slightly Lower—Crude Coconut Quiet with Light Offerings—

The price movement of the principal fats and oils in the past month was a mixed one, but the declines greatly exceeded the gains and considerable shading of established price levels was reported. Light offerings aided in holding the markets up. Purchasing continued to be pretty much of the hand-to-mouth variety. Buyers are unwilling to make definite long-term commitments with conditions as uncertain as they are from day to day.

Chinawood lost about ½c during the period under review. Trading was very light. Both consumers and dealers are content to await future developments and there is little willingness to speculate on the item. In sympathy with the decline in Chinawood and also in view of the absence of any real demand, quotations on perilla were shaded. Quotations on corn and peanut oils were easier, influenced, of course, by the trend of the market in the competing material. After a comparatively long period of price stability, lower prices were made for crude and refined soybean oil.

A slightly lower price level was established for the refined fish oils. In the face of exceptionally light trading, quotations on linseed held steady and unchanged from the price levels in force at the year-end.

Quiet conditions prevailed in the market for crude coconut oil. Prices, however, held fairly steady. Soapers have shown very little interest in this item for several weeks now and there is a general feeling in marketing circles that before very long the product will receive more direct attention.

Lard was much firmer. Higher prices prevailed for several grades of neatsfoot. Oleo oil was lower and stearin was available at concessions. The market for refined cottonseed oil was influenced by the severe break in the securities' markets. Tallow offerings generally were light and the market had a steady tone most of the period under review.

Of more than passing interest was an advance of ½c in stearic acid. This product for several months has been weak and the upward price movement came somewhat as a surprise. Red oil was also advanced ½c.

Considerable competition broke out in degras. Quotations were shaded from ½c to 1c per lb., depending upon quality and quantity. The establishment of lower prices failed to develop any appreciable broadening of demand.

With the active paint season just about to break, there is a general feeling that the demand for drying oils must experience a sharp increase immediately. Stocks in consumers' hands are said to be at a very low point, necessitating considerable purchasing. In view of this situation and also in face of the fact that the soap manufacturers have not generally been such heavy buyers in recent weeks, the opinion is pretty generally held that purchasing will jump considerably in the next 30 days and that prices will become firmer. In the past two weeks a basis for this belief has been in evidence. A much larger number of inquiries have been in the market than for some months past.

Hankow Market Quiet

There were no arrivals of tung oil at Hankow from up country or any exports of the oil from that port made in December, according to a radiogram from the American Consulate General at Hankow made public by the Dept. of Commerce.

Radiogram reported that stocks of oil on hand at Hankow the end of December amounted to 13,149 short tons, the same quantity on hand at the end of November. Hankow market remained inactive with no transactions and no price quotations. It was also stated in the report that no tung oil was known to be in the hands of the Japanese and no shipments of the oil were expected to be made in the near future.

Radiograms dispatched by the American Consulate General at Hong Kong stated that it was impossible to estimate with any degree of accuracy the receipts of tung oil reaching Hong Kong during December or any given periods, since arrivals are so irregular and by devious routes.

Important Price Changes

ADVANCED	Jan. 31	Dec. 31
Oil Babassu, tks.	\$0.06½	\$0.06⅛
Lard, common No. 1, bbls.	.09	.08¾
No. 2	.08¾	.08½
extra	.09⅜	.09
extra, No. 1	.09¼	.09
Neatsfoot, extra	.09¼	.09
extra, No. 1	.09	.08¾
pure	.11¾	.10¾
prime	.09½	.09
DECLINED		
Oil castor, sulfonated, 50% drs.	\$0.06⅛	\$0.06¼
Chinawood, drs.	.15	.15½
tks.	.14½	.15
Cod, Newfoundland	.29	.35
Norwegian	.25	.26
Corn, crude, tks.	.06⅛	.06½
refined	.09	.09¼
Menhaden ref'd alkali, drs.	.076	.077
tks.	.07	.071
blown	.076	.077
light pressed, drs.	.07	.071
tks.	.064	.065
Oiticica, drs.	.10½	.11
Oleo No. 1, bbls.	.08	.08½
Oleo No. 2, bbls.	.07¼	.07¾
Peanut, crude, tks.	.06⅛	.06⅝
ref'd edible, bbls.	.09½	.10
Perilla, drs.	.09⅝	.09¾
tks.	.09	.092
Sardine, crude, tks.	.28½	.31
ref'd alkali, drs.	.076	.077
tks.	.07	.071
light-pressed	.07	.071
tks.	.064	.06½
Soybean, crude, tks.	.05½	.05¾
ref'd, tks.	.067	.0675

Wafer Heads Salesmen

Joseph Wafer, of the Industrial Chemical Sales Division of West Virginia Pulp & Paper, was formally installed as president of the Salesmen's Association of the American Chemical Industry at a meeting in the Chemists' Club, N. Y. City on Jan. 12.

Other officers installed were:—Vice-president, Bart Sheehan, of the Grasselli Chemicals Dept. of du Pont; treasurer (re-elected), DeWitt Thompson, Mathieson Alkali, and secretary, C. Oscar Lind, of Dow Chemical. Elected to the executive committee were:—Ray A. Giebel, Harshaw Chemical, and George A. Bode, of the R. & H. Chemical Division of du Pont.

Members of the various committees are: —Entertainment, B. F. Sheehan; Frank Fanning, of N. I. Malmstrom & Co.; N. H. Fyffe, Oldbury Electrochemical; R. C. Quortrup, Barrett; G. S. Furman, Merck; John J. Butler, Jr., of the industrial chemical sales division of West Virginia Pulp & Paper; Wm. J. Weed, Niagara Alkali.

Publicity, chairman, E. J. Maguire of the Grasselli Chemicals Dept. of du Pont; W. J. Murphy, of CHEMICAL INDUSTRIES; Russell Boland, Topics Publishing Co.; Thos. R. Farrell, of *Drug & Cosmetic Industry*; Thos. S. McCarthy, of the *Oil, Paint & Drug Reporter*.

Auditing, chairman, Robert B. Magnus, of Magnus, Mabee & Reynard, Inc.; Bruce Puffer, Commercial Solvents; James C. Chilcott, Maltine Co.; membership, chairman, James J. Kerrigan, Merck; W. D. Barry, Mallinckrodt; G. S. Furman, Merck; R. E. Dorland, of Dow; V. E. Williams, of Monsanto.

Smith Retires

F. Carleton Smith, long prominent in the linseed and crushing industry, and vice-president of the Minnesota Linseed Oil Paint Co., retired from business Feb. 1. Mr. Smith will make his home in Southern California, following a few months of travel.

Frank E. Wilson, Philadelphia distributor of alkalies, acids, and sanitary chemicals, is now in new and larger quarters at 1514 N. Front st.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1937 Average $1.10 - Jan. 1938 $1.20 - Jan. 1939 $1.25

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Acetaldehyde, drs. c-l, wks lb	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kgs lb.	.39	.43	.39	.43	.32	.43
Acetanalid, tech, 150 lb bbls lb.	...	.29	...	.29	.29	.32
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.10½	.11	.10½	.11	.10½	.11
Acetin, tech, drs. lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.04¼	.04¼	.04¾	...	.04¾
drs, c-l, f.o.b. wks, frt all'd lb.	...	.05¾	...	.05¾	...	.05¾
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.08¾	.09	.08¾	.09	.08¾	.10
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.23	...	2.23	...	2.23
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	...	7.62
glacial, USP, bbls, c-l, wks. 100 lbs.	...	10.25	...	10.25	...	10.25
Acetylsalicylic, USP, 225 lb bbls lb.	...	.50	...	.50	.50	.60
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech, bbls lb.	...	.75	...	.75	...	.75
Ascorbic, bot oz.	3.00	3.25	3.00	3.25	...	...
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	96.00	...	96.00	95.00	96.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	5.50	5.70
Caproic, normal, drs. lb.	...	.35	...	.35	...	...
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. lb. *b*	.21	.22½	.21	.22½	.22	.25
anhyd, gran, bbls lb. *b*	...	.24	.24½	.25	.25½	.26½
Cleve's, 250 lb bbls lb.	...	.57	...	.57	.50	.57
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.63	.64	.63	.64	.63	.91
99%, straw, LB, drs, wks, frt equal gal.	.69	.71	.69	.71	.69	.94
resin grade, drs, wks, frt equal lb.	.09	.09½	.09	.09½	.09	.11¼
Crotonic, bbls, delv lb.	.21	.50	.21	.50	.21	1.00
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls lb.	...	.75	...	.75	.60	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.70	.73	.70	.73	.70	.79
USP, bbls lb.	.77	.81	.77	.81	.77	.91
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 47% lb.	...	2.30	...	2.30	2.20	2.30
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.42	.44	.42	.44	.42	.44
Hydrochloric, see muriatic						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.09	.09½	.09	.09½	.09	.15
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys lb.	.42	.45	.42	.45	.42	.45
Lauric, drs. lb.	11¾	.12¼	.11¾	.12¼	.08½	.12¼
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.46
Levulinic, 5 lb bot wks lb.	...	2.00	...	2.00	...	2.00
Linoleic, bbls lb.	...	.20	...	.20	...	.20
Maleic, powd, kgs lb.	.30	.40	.30	.40	.30	.40
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	...	1.50	...	1.50
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks 100 lb.	...	1.10	...	1.10	...	1.10
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.13	.10	.13
Sludges, drs lb.	...	.05	...	.05	...	.05
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	...	.07½	...	.07½	.07½	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs lb.	...	.22	...	.22	...	.22
80% lb.	.16	.17½	.16	.17½	.16	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	1.05	...	1.05
cryst, USP lb.	1.45	1.63	1.45	1.63	1.45	1.63
Ricinoleic, bbls lb.	...	.35	...	.35	.35	.38
tech, bbls lb.	...	.13	...	.13	...	.13
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.35	.40	.35	.40	.35	.45
Sebacic, tech, drs, wks lb.	...	nom.	...	nom.	.37	.41
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks 100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.40	.47	.40	.47	.40	.47
Tartaric, USP, gran, powd, 300 lb bbls lb.	.27¼	.27¾	.27¼	.27¾	.24¼	.27¾
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.67
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	1.70	1.80	1.70	1.80	1.65	2.00
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb. bbls lb.	.52	.60	.52	.60	.52	.60
dark, bbls lb.	.13	.18	.13	.18	.11	.18
egg, edible lb.	.73	.75	.73	.78	.77	1.15
vegetable, edible lb.	.74	.78	.74	.78	.74	.78
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.101	...	.101	.101	.106
c-l, drs, delv lb.	...	.111	...	.111	.111	.116
lcl, drs, delv lb.	...	.121	...	.121	.121	.126
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
drs, c-l, delv E, of Rockies lb.	...	.09½	...	.09½	...	.09½
Benzyl, cans lb.	.68	1.00	.68	1.00	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.08	.08	.08½	.08½	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.09	.09	.09½	.09½	.10
Butyl, secondary, tks, delv lb. *d*	...	.06	...	.06	...	.06
c-l, drs, delv lb. *d*	...	.07	...	.07	...	.07
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
Denatured, CD, 14, 13, c-l, drs, wks gal. *e*	...	.31	.31	.32	.31	.35
tks, East, wks gal.	...	.23	.23	.24	.23	.29
Western schedule, c-l, drs, wks gal. *e*	...	.36	.36	.37	.36	.38
Denatured, SD, No. 1, tks,	...	.21	.21	.22	.22	.27
c-l, drs, wks gal. *e*	...	.27	.27	.28	.28	.33

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

FOR NEW RESEARCH PRODUCTS START WITH

ACETALDEHYDE—to make rubber accelerators, rubber antioxidants, synthetic resins, dyestuffs, synthetic organic chemicals, preservatives, and tanning materials.

PARALDEHYDE—to make synthetic resins, plastics, dyestuffs, medicinals, rubber accelerators and antioxidants, and synthetic organic chemicals.

CROTONALDEHYDE—to make dyes, rubber accelerators and antioxidants, solvents for oils, fats, waxes, and petroleum, insecticides and lachrymatory products.

ACETALDOL—to make synthetic resins and plastics, butylene glycol, butadiene, other organic chemicals, ore flotation reagents, and rubber age resisters and antioxidants.

PARALDOL—a very pure polymeric form of acetaldol, used to make similar products as listed above.

Samples and further information on request

NIACET CHEMICALS CORPORATION
NIAGARA FALLS, N. Y.

Acid, Fluoboric
Acid, Hydrofluoric
Acid, Hydrofluoric Anhydrous
Acid, Hydrofluosilicic
Aluminum Fluoride
Ammonium Acid Fluoride
Ammonium Fluoborate
Ammonium Silicofluoride
Antimony Trifluoride
Barium Fluoride
Barium Silicofluoride
Bismuth Fluoride
Boron Trifluoride
Boron Trifluoride-Ethyl Ether Complex
Calcium Fluoride
Chromium Fluoride
Cryolite
Fluorspar
Lithium Fluoride
Lithium Fluoride Optical Crystals
Magnesium Fluoride
Magnesium Silicofluoride
Nickel Fluoborate
Nickel Fluoride
Potassium Acid Fluoride
Potassium Aluminum Fluoride
Potassium Fluoborate
Potassium Fluoride
Sodium Acid Fluoride
Sodium Fluoborate
Sodium Fluoride
Sodium Silicofluoride
Zinc Fluoride
Zinc Silicofluoride

COMPOUNDS OF FLUORINE

THE HARSHAW CHEMICAL CO.

Manufacturers, Importers, Merchants • Offices and Laboratories: Cleveland, Ohio
Quality products since 1892
New York, Philadelphia, Chicago, Detroit, Pittsburgh, Cincinnati, East Liverpool, Los Angeles, San Francisco
Works at Cleveland and Elyria, Ohio, and Philadelphia, Pa.

Prices—Current

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Alcohols (continued):						
Diacetone, pure, c-l, drs, delv ... lb. *f*	...	.09	.09	.11½	...	.11½
tech, contract, drs, c-l, delv ... lb.	...	.08½	.08½	.10½	...	.10½
Ethyl, 190 proof, molasses, tks ... gal. *g*	...	4.47½	4.47½	4.48½	4.04	4.51½
c-l, drs ... gal. *g*	...	4.53½	4.53½	4.54½	4.10	4.59½
c-l, bbls ... gal. *g*	...	4.54½	4.54½	4.55½	4.11	4.58½
Furfuryl, tech, 500 lb drs lb.	.25	.35	.25	.35	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ... lb.	...	.13	...	.13	...	.13
Normal, drs, wks ... lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ... lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs ... lb.	...	.09	...	.09	.09	.10
c-l, drs ... lb.	...	.08½	...	.08½	.08½	.09½
tks ... lb.	...	.07½	...	.07½	.07½	.08½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ... lb.	...	.36	...	.36	...	.36
Ref'd 98%, drs, f.o.b. wks, frt all'd ... gal.	...	.41	...	.41	...	.41
Tech 91%, drs, above terms ... gal.	...	.33½	...	.33½	...	.33½
tks, same terms ... gal.	...	.28½	...	.28½	...	.28½
Tech 98%, drs, above terms ... gal.	...	.37½	...	.37½	...	.37½
tks, above terms ... gal.	...	.32½	...	.32½	...	.32½
Spec Solvent, tks, wks gal.	...	.22	.22	.23	.23	.28
Aldehyde ammonia, 100 gal drs ... lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv ... lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ... lb.	...	.20	...	.20	...	.20
Alphanaphthol, crude, 300 lb bbls ... lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ... lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ... 100 lb.	3.40	3.65	3.40	3.65	3.40	3.65
delv NY, Phila ... 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls wks ... 100 lb.	3.15	3.40	3.15	3.40	3.15	3.40
Powd, c-l, bbls, wks 100 lb.	...	3.55	...	3.55	...	3.55
Chrome, bbls ... 100 lb.	6.50	6.75	6.50	6.75	6.50	6.75
Potash, lump, c-l, bbls, wks ... 100 lb.	3.65	3.90	3.65	3.90	3.65	3.90
Granular, c-l, bbls, wks ... 100 lb.	3.40	3.65	3.40	3.65	3.40	3.65
Powd, c-l, bbls, wks 100 lb.	3.80	4.05	3.80	4.05	3.80	4.05
Soda, bbls, wks ... 100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	20.00	...	20.00	...	20.00
Acetate, 20%, bbls ... lb.	.07½	.09	.07½	.09	.07½	.10
Basic powd, bbls, delv. lb.	.40	.50	.40	.50	.40	.50
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ... lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
Solution, drs, wks ... lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ... lb.	...	.13	...	.13	...	.13
Hydrate, 96%, light, 90 lb bbls, delv ... lb.	.12	.13	.12	.13	.12	.13
heavy, bbls, wks ... lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ... lb.	.16¾	.18½	.16¾	.18½	.16¾	.18½
Palmitate, bbls ... lb.	...	.23	...	.23	...	.23
Resinate, pp., bbls ... lb.	...	.15	...	.15	...	.15
Stearate, 100 lb. bbls ... lb.	.19	.21	.19	.21	.19	.21
Sulfate, com, c-l, bgs, wks ... 100 lb.	...	1.15	...	1.15	1.15	1.35
c-l, bbls, wks ... 100 lb.	...	1.35	...	1.35	1.35	1.55
Sulfate, iron-free, c-l, bgs, wks, ... 100 lb.	...	2.00	...	2.00	...	2.00
c-l, bbls, wks ... 100 lb.	...	2.20	...	2.20	...	2.20
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.16	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH cont.	...	.04z	...	.04z	...	.05**
tk wagon ... lb.	...	.02	...	.02	...	.02
Ammonium Acetate, kgs ... lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks ... 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls ... lb.	.14½	.16½	.14½	.16½	.14½	.17
carbonate, tech, 500 lb bbls ... lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks ... 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks ... 100 lb.	5.50	6.25	5.50	6.25	5.50	6.25
Lump, 500 lb cks spot lb.	.10½	.11	.10½	11.	.10½	.11
Lactate, 500 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ... lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ... lb.	...	.15	...	.15	...	.15
Naphthenate, bbls ... lb.	...	.17	...	.17	...	.17
Nitrate, tech, cks ... lb.	.038	.0405	.038	.0405	.038	.0405
Oleate, drs ... lb.	...	.15	...	.15	...	.15
Oxalate, neut, cryst, powd, bbls ... lb.	.19	.20	.19	.20	.19	.22½
Perchlorate, kgs ... lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs ... lb.	.21	.24	.21	.24	.21	.24
Phosphate, dibasic tech, powd, 325 lb bbls ... lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls ... lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls ... lb.	...	.24	...	.24	...	.24
Paste, bbls ... lb.	...	.07½	...	.07½	...	.07½

g Grain alcohol 25c a gal. higher in each case. **On a delv. basis.
z On a f.o.b. wks. basis.

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Ammonium (continued):						
Sulfate, dom, f.o.b., bulk ton	...	27.75	...	27.75	26.50	28.50
Sulfocyanide, pure, kgs ... lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane) tks, delv ... lb.	...	.095	.095	.10	.10	.11½
c-l, drs, delv ... lb.	...	.105	.105	.11	...	...
lcl, drs, delv ... lb.	...	.115	.115	.112	...	...
tech, drs, delv ... lb.	...	.10½	...	.10½	.11	.10½
Secondary, tks, delv. ... lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ... lb.	...	.09½	...	.09½	...	.09½
tks, delv ... lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ... lb.	.07	.077	.07	.077	.07	.077
tks, wks ... lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks ... lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ... lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs ... lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ... lb.	.102	.11	.102	.11	.102	.11
tks, wks ... lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ... lb.	.14½	.17½	.14½	.17½	.14½	.17½
Annatto fine ... lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ... lb.	...	.75	...	.75	...	.75
40% ... lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls ... lb.	...	.65	...	.65	...	.65
Antimony metal slabs, ton lots ... lb.	...	.11¾	.11¼	.11¾	.10¾	.14
Butter of, see Chloride.						
Chloride, soln cbys ... lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ... lb.	.12½	.14	.12½	.14	.12½	.16
Oxide, 500 lb bbls ... lb.	.11½	.12½	.11½	.12½	.11½	.16½
Salt, 63% to 65%, tins lb.	.26	.27	.26	.27	.26	.27
Sulfuret, golden, bbls ... lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls ... lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ... lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks ... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ... lb.	.08½	.09	.08½	.09	.08½	.09
Arsenic, Metal ... lb.	.40	.41	.40	.41	.40	.44
Red, 224 lb cs kgs ... lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs ... lb.	.03	.03¾	.03	.03¾	.03	.04
B						
Barium Carbonate precip, 200 lb bgs, wks ... ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ... ton	41.00	43.00	41.00	43.00	41.00	44.00
Chlorate, 112 lb kgs, NY lb.	.16½	.17½	.16½	.17½	.16½	.17½
Chloride, 600 lb bbls, delv, zone 1 ... ton	77.00	92.00	77.00	92.00	77.00	.92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls ... lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, bbls ... lb.	.06¾	.07¼	.06¾	.07¼	.06¾	.08¼
Barytes, floated, 350 lb bbls c-l, wks ... ton	...	.23.65	...	23.65	...	23.65
Bauxite, bulk, mines ... ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ... ton	...	16.00	...	16.00	...	16.00
200 mesh ... ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ... lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd ... gal.	...	.16	...	.16	...	.16
90% c-l, drs ... gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls ... lb.	.70	.72	.70	.72	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, 95-97% rfd, drs ... lb.	.30	.40	.30	.40	.30	.40
Tech, drs ... lb.	.25	.26	.25	.26	.25	.26
Beta-Naphthol, 250 lb bbls, wks ... lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ... lb.	.51	.52	.51	.52	.51	.52
Bismuth metal ... lb.	1.05	1.15	1.05	1.15	1.00	1.10
Chloride, boxes ... lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ... lb	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes ... lb.	...	2.95	...	2.95	...	2.95
Subbenzoate, boxes ... lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs ... lb.	1.53	1.56	1.53	1.56	1.13	1.58
Trioxide, powd, boxes ... lb.	...	3.57	...	3.57	...	3.57
Subnitrate, fibre, drs ... lb.	1.33	1.36	1.33	1.36	1.03	1.48
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	40.00	75.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks ... lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	3.30	3.25	3.50	2.50	3.25
Chicago, high grade ... unit	...	3.35	...	3.35	2.35	3.35
Imported shipt ... unit	...	2.95	2.95	3.00	2.90	3.45
Blues, Bronze Chinese Milori Prussian Soluble ... lb.	.36	.37	.36	.37	.36	.37
Ultramarine,* dry, wks, bbls ... lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	...	.16	...	.16	...	.16
Special, group 1 ... lb.	...	.19	...	.19	...	.19
Pulp, No. 1 ... lb.	...	.27	...	.27	...	.27
Bone, 4½ + 50% raw, Chicago ... ton	28.00	29.00	28.00	29.00	25.50	30.00
Bone Ash, 100 lb kgs ... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ... lb.	.06½	.08¼	.06½	.08¼	.06½	.08¼
Meal, 3% & 50%, imp ton	...	22.00	22.00	22.50	20.50	23.75
Domestic, bgs, Chicago ton	...	25.00	24.00	26.00	16.00	26.00
Borax, tech, gran, 80 ton lots, sacks, delv ... ton *i*	...	43.00	...	43.00	42.00	43.00
bbls, delv ... ton *i*	...	53.00	...	53.00	52.00	53.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

Eastman Hydroquinone
Chemically Pure

THREE important properties—purity, uniformity, freshness—characterize Eastman Hydroquinone. It is held to rigid purity standards by stringent photographic requirements . . . years of manufacturing experience assure uniformity . . . delivery is prompt, from fresh stocks.

OTHER EASTMAN CHEMICALS

•

Silver Nitrate

Pyrogallic Acid

Gallic Acid

p-Aminophenol

Nitrocellulose Solutions

Research Organic Chemicals

Information and quotations will be furnished upon request.
Eastman Kodak Co., Chemical Sales Division, Rochester, N. Y.

Eastman Tested Chemicals

ABC

FORMALDEHYDE

U. S. P.

Manufactured by Kay-Fries Chemicals, Inc.

Tank Cars Drums Carboys

Inquiries Solicited

AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK, N.Y.

Save money—replace more expensive containers with Fulton Waterproof Paper Lined Bags for shipping, storing chemicals, pigments and any products that require sift-proof and moisture-proof containers. Bags are cheaper, store more easily and save you freight.

If you are now buying Waterproof Paper Lined Bags, we can furnish you a bag second to none at a price that will interest you. Quick shipments from Atlanta, Georgia and St. Louis, Missouri. Please send us your requirements—prices furnished promptly.

FULTON BAG & COTTON MILLS

Manufacturers since 1870

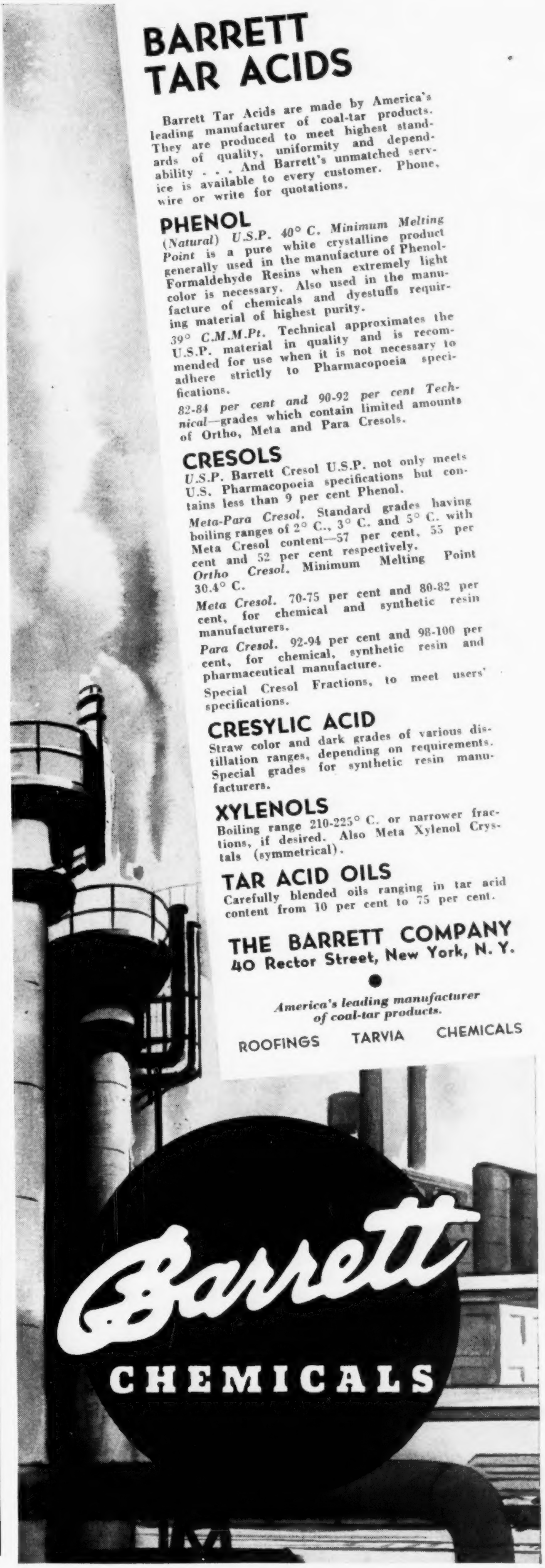
ATLANTA ST. LOUIS NEW YORK NEW ORLEANS
MINNEAPOLIS DALLAS KANSAS CITY, KANS.

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Borax (continued)						
Tech, powd, 80 ton lots, sacks ... ton *i*	...	47.00	...	47.00	...	47.00
bbls, delv ... ton *i*	...	57.00	...	57.00	...	57.00
Bordeaux Mixture, drs ... lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ... lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.90½	.92½	.90½	.92½
Gold, blk ... lb.	.45	.65	.45	.65	.45	.65
Butanes, com 16-32° group 3 tks ... lb.	.02¼	.03¾	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt allowed ... lb.	...	.09	.09	.09½	.09½	.10½
tks, frt allowed ... lb.	...	.08	.08	.08½	.08½	.09
Secondary, tks, frt allowed ... lb.	...	.06½	...	.06½	.06½	.07
drs, frt allowed ... lb.	.07½	.08	.07½	.08	.07½	.08½
Aldehyde, 50 gal drs, wks ... lb.	.16½	.17½	.16½	.17½	.16½	.17½
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Crotonate, norm, 55 and 110 gal drs, delv ... lb.	...	.36	...	36	...	.36
Lactate ... lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs. frt allowed lb.	...	.25	...	.25	...	.25
Propionate, drs ... lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ... lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ... lb.	...	.26	...	.26	...	.26
Tartrate, drs ... lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
C						
Cadmium Metal ... lb.	...	.80	.80	.85	.85	1.60
Sulfide, orange, boxes lb.	.80	.90	.80	.90	.80	1.60
Calcium, Acetate, 150 lb bgs c-l, delv ... 100 lb.	...	1.65	...	1.65	...	1.65
Arsenate, c-l, E. of Rockies. dealers, drs ... lb.	.06¾	.07¼	.06¾	.07¼	.06¾	.07¼
Carbide, drs ... lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ... lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv ... ton	...	22.00	...	22.00	22.00	23.50
paper bgs, c-l, delv ... ton	23.00	36.00	23.00	36.00	23.00	36.00
Solid, 650 lb drs, c-l, delv ... ton	...	20.00	...	20.00	20.00	21.50
Ferrocyanide, 350 lb bbls wks ... lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls ... lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ... lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bgs ... ton	...	28.00	...	28.00	...	28.00
Palmitate, bbls ... lb.	.22	.23	.22	.23	.22	.23
Phosphate, tribasic, tech, 450 lb bbls ... lb.	.06½	.07½	.06½	.07½	.06½	.07½
Resinate, precip, bbls ... lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.19	.21
Camphor, slabs ... lb.	.50	.51	.50	.52½	.52	.56
Powder ... lb.	.50	.51	.50	.52½	.52	.56
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone† ... lb.	.02¾	.03¾	.02¾	.03¾	.027	.0380
lcl, bgs, f.o.b. whse ... lb.	...	.06¼	...	.06¼	.05¾	.06¼
cartons, f.o.b. whse ... lb.	...	.06¼	...	.06¼	...	.06¼
cases, f.o.b. whse ... lb.	...	.07	...	.07	...	.07
Decolorizing, drs, c-l ... lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ... lb.	.05	.05½	.05	.05½	.05	.06
Casein, Standard, Dom, grd lb.	.08½	.11	.08½	.11	.06½	.13½
80-100 mesh, c-l, bgs ... lb.	.09	.11½	.09	.11½	.07	.14
Castor Pomace, 5½ NH_3, c-l, bgs, wks ... ton	...	18.50	...	18.50	18.50	21.00
Imported, ship, bgs ... ton	...	20.00	...	20.00	20.00	21.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ... lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ... lb.	...	.36	...	.36	.36	.40
Chalk, dropped, 175 lb bbls lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	.02¾	.03¼	.02¾	.03¼	.02¼	.04
Light, 250 lb cks ... lb.	.03¼	.04	.03¼	.04	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ... bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ... ton	23.00	34.00	23.00	34.00	23.00	34.00
Willow, powd, 100 lb bbls, wks ... lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks lb.	...	.01⅝	...	.01⅝	.01⅝	.02125
25%, bbls, wks ... lb.	...	.02	...	.02	.02	.0225
Pwd, 60%, 100 lb bgs, wks ... lb.	...	.04½	...	.04½	.04½	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	...	7.00
Imported, lump, blk ... ton	22.00	25.00	22.00	25.00	22.00	25.00
Chlorine, cyls, lcl, wks, contract ... lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ... lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.00	...	2.00	2.00	2.15
Multi, c-l, cyls, wks, cont ... lb.	...	2.15	...	2.15	2.30	2.55
Chloroacetophenone, tins, wks ... lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks ... lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ... lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ... lb.	.30	.31	.30	.31	.30	.31
Chloropicrin, comml cyls ... lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ... lb.	.21	.25	.21	.25	.21	.25
Yellow ... lb.	.14½	.15½	.14½	.15½	.14½	.15½

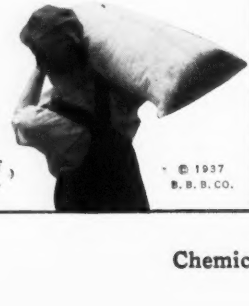
j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Chromium Acetate, 8% Chrome, bbls ....lb.	.05	.08	.05	.08	.05	.08
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ....bbl.	7.50	8.00	7.50	8.00	7.50	8.00
Cobalt Acetate, bbls .....lb.	.65	.67	.65	.67	.65	.68
Carbonate tech, bbls ...lb.	...	1.63	...	1.63	...	1.63
Hydrate, bbls ....lb.	...	1.78	...	1.78	1.36	1.78
Linoleate, solid, bbls...lb.	...	.33	...	.33	...	.33
paste, 6%, drs ......lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ......lb.	...	1.67	...	1.67	...	1.67
Resinate, fused, bbls...lb.	...	.13½	...	.13½	...	.13½
Precipitated, bbls ....lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.35	.38	.35	.38	.35	.38
Teneriffe silver, bgs ...lb.	.36	.39	.36	.39	.36	.39
Copper, metal, electrol 100 lb.	...	11.25	...	11.25	9.00	11.25
Acetate, normal, bbls, wks ....lb.	.21	.23	.21	.23	.21	.23
Carbonate, 400 lb bbls..lb.	.10½	.11½	.10½	.11½	.10¼	.11½
52-54% bbls ....lb.	.14½	.15½	.14½	.15½	.1340	.16¾
Chloride, 250 lb bbls...lb.	.13	.14	.13	.14	.12½	.17
Cyanide, 100 lb drs ...lb.	...	.34	...	.34	.34	.38
Oleate, precip, bbls ....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	.16¾	.17¾	.16¾	.17¾	.13½	.17¾
red 100 lb bbls ......lb.	16¾	.17¾	.16¾	.17¾	.15	.19775
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.50	...	4.50	4.00	4.50
Copperas, crys and sugar bulk c-l, wks ....ton	...	14.00	...	14.00	12.00	14.00
Corn Sugar, tanners, bbls 100 lb.	3.09	3.19	3.05	3.19	2.95	3.30
Corn Syrup, 42°, bbls 100 lb.	...	3.12	...	3.12	2.89	3.16
43°, bbls ....100 lb.	...	3.17	...	3.17	2.94	3.21
Cotton, Soluble, wet, 100 lb bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ....lb.	.22¾	.23¼	.22¾	.23¼	.19¾	.23¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks .....gal.	.13½	.14	.13½	.14	.13½	.14
Grade 2 ....gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs ....lb.	.10	.10½	.10	.10½	.10	.12½
Crotonaldehyde, 97%, 55 and 110 gal drs, delv ....lb.	...	.22	...	.22	.22	.30
Cutch, Philippine, 100 lb bale lb.	.04¼	.04½	.04¼	.04½	.04	.06
Cyanamid, bgs c-l, frt allowed Ammonia ....unit	...	1.15	...	1.15	...	1.15
D						
Derris root 5% rotenone, bbls ....lb.	.24	.30	.24	.30	.34	.43
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	3.50	3.70	3.40	3.70	3.30	3.75
British Gum, bgs ...100 lb.	3.75	3.95	3.65	3.95	3.55	4.00
Potato, Yellow, 220 lb bgs lb.	.07¼	.08¾	.07¼	.08¾	.07¼	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ...lb.	...	.0715	...	.0715	.0715	.08
White, 140 lb bgs ..100 lb.	3.35	3.55	3.35	3.55	3.30	3.70
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.47	.75
Diamylene, drs, wks .....lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ...lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks..lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks lb.	.19	.19½	.19	.19½	.19	.21
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.55	...	.55	...	.55
Dibutyl Ether, drs, wks, lcl lb.	...	.25	...	.25	.25	.30
Dibutylphthalate, drs, wks, frt all'd ....lb.	.19	.19½	.19	.19½	.19	.21
Dibutyltartrate, 50 gal drs lb.	.45	.54	.45	.54	.45	.54
Dichlorethylene, drs .....lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		...	...
tks, wks ....lb.	no prices		no prices		...	...
Diethanolamine, tks, wks..lb.	...	.23	...	.23	...	.23
Diethylamine, 400 lb drs..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs lb.	.40	.52	.40	.52	.40	.50
Diethyl Carbinol, drs.....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31¾	.35	.31¾	.35	.31¾	.35
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ....lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs ....lb.	.16	.17	.16	.17	.16	.17
Mono ethyl ethers, drs..lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Mono butyl ether, drs..lb.	.23	.24	.23	.24	.23	.24
tks, wks ....lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls ....lb.	...	.21	...	.21	...	.21
Laurate, bbls ....lb.	...	.27½	...	.27½	...	.27½
Stearate, bbls ....lb.	...	.27½	...	.27½	...	.27½
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	...	1.00	...	1.00	...	1.00
Dimethylaniline, 340 lb drs lb.	.23	.24	.23	.24	.23	.27
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed ....lb.	...	.19	...	.19	...	.19
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. k	.16	.19	.16	.19	.16	.19

k Higher price is for purified material.



Boost your salesmen in ... not out! Give them this *plus* feature to talk about: "Shipment in Bemis Waterproof Bags!" These modern containers assure *factory fresh* arrival ... reduce damage from moisture, dust, odors and drying out ... save on packing and shipping costs. Send for details.



BEMIS BRO. BAG CO.
407 Poplar Street, St. Louis
5104 2nd Avenue, Brooklyn

Bemis 3-Ply Protection
Burlap or cotton cemented to siftproof paper with a flexible waterproof adhesive.

© 1937 B. B. B. CO.

Dinitrochlorobenzene
Glauber's Salt

Prices

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Dinitrochlorobenzene, 400 lb bbls ....lb.	.13½	.14	.13½	.14	.13½	.14
Dinitronaphthalene, 350 lb bbls ....lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	...	.15½
Diphenyl, bbls ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.32	.32	.31	.32
Diphenylguanidine, 100 lb drs ....lb.	.31	.32	.31	.32	.31	.32
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	...	nom.	...	nom.	...	nom.
Extract ....lb.	.05¾	.06¾	.05¾	.06¾	.05	.06¾
E						
Egg Yolk, dom., 200 lb cases lb.	.65	.67	.65	.69	.60	.69
Imported ....lb.	...	nom.	...	nom.	.62	.68
Epsom Salt, tech, 300 lb bbls c-l, NY ....100 lb.	1.90	2.10	1.90	2.10	1.90	2.10
USP, c-l, bbls .....100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs ....lb.	.22	.23	.22	.23	.22	.23
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs ...lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ......lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ...lb.	...	.68	...	.68	...	.68
Synthetic, wks, drs ...lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd ....lb.	...	.051	...	.051	.051	.05½
drs, frt all'd ....lb.	...	.061	...	.061	.061	.06½
99%, tks, frt all'd ...lb.	...	.0585	...	.0585	.0585	.06¾
drs, frt all'd ....lb.	...	.0685	...	.0685	.0685	.07¾
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Cellullose, drs, wks, frt all'd ....lb.	.45	.50	.45	.50	.45	1.00
Chloride, 200 lb drs ...lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys ..lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt all'd ..lb.	.27	.28	.27	.28	.27	.28
Lactate, drs, wks ......lb.	...	.33	...	.33	...	.33
Oxalate, drs, wks .....lb.	.30	.34	.30	.34	.30	.34
Oxybutyrate, 50 gal drs, wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks ......lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont ....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks ..lb.	.17	.21	.17	.21	.17	.21
tks, wks ....lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks ....lb.	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks .....lb.	...	.14	...	.14	...	.14
tks, wks ....lb.	...	.13	...	.13	...	.13
Mono Methyl Ether, drs wks ....lb.	.18	.22	.18	.22	.18	.22
tks, wks ....lb.	...	.17	...	.17	...	.17
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
F						
Feldspar, blk pottery ....ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk, wks .....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground wks ....unit *l*	...	no prices	...	no prices	2.75	3.30
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	2.50	...	2.50	2.50	2.50
Fluorspar, 98% bgs .....lb.	...	33.00	...	33.00	...	33.00
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	10.00	11.00	10.00	11.00	10.00	11.00
Imp powd, c-l, bgs ...ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb. drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.12½	.14	.12½	.14	.12½	.14
Fustic, crystals, 100 lb boxes ....lb.	.22	.26	.22	.26	.22	.26
Liquid 50°, 600 lb bbls lb.	.09½	.13	.09½	.13	.09½	.13
Solid, 50 lb boxes ......lb.	.17½	.19½	.17½	.19½	.17½	.19½
G						
G Salt paste, 360 lb bbls ..lb.	.45	.47	.45	.47	.45	.47
Gall Extract ....lb.	.19	.20	.19	.20	.19	.20
Gambier, com 200 lb bgs lb.	.06¾	.07¾	.06¾	.07¾	.06¾	.07¾
Singapore cubes, 150 lb bgs ....100 lb.	.08½	.09	.08½	.09	.08½	.11
Gelatine, tech, 100 lb cs ..lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l, bgs, wks* ....100 lb.	.95	1.15	.95	1.15	.95	1.15
Anhydrous, see Sodium Sulfate						

l + 10; *m* + 50; *Bbls. are 20c higher.

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Glue bone, com grades, c-l bgs ....lb.	.11½	.13½	.11½	.13½	.13	.16½
Better grades, c-l, bgs lb.	.15	.16½	.15	.16½	.14½	.16½
Glycerin, CP, 550 lb drs lb.	...	.12½	...	.12½	.12½	.16
Dynamite, 100 lb drs..lb.	...	nom.	...	nom.	.12¾	.16
Saponification, drs ....lb.	.09	.10	.08½	.10	.08½	.11¼
Soap Lye, drs ....lb.	.07½	.07¾	.07½	.07¾	.07½	.10¼
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ..lb.	...	.27	...	.27	...	.27
Monostearate, bbls .....lb.	...	.30	...	.30	...	.30
Oleate, bbls ....lb.	...	.22	...	.22	...	.22
Phthalate ....lb.	...	.37	...	.37	...	.37
Glyceryl Stearate, bbls ...lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls..lb.	...	.23	.23	.23	...	.26
Phthalate, drs ....lb.	...	.39	.39	.40	...	.40
Stearate, drs ....lb.	...	.25	.25	.27½	...	.27½
GUMS						
Gum Aloes, Barbadoes ...lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ...lb.	.09	.09¼	.09	.09¼	.09	.12
White sorts, No. 1, bgs lb.	23	.24	.23	.24	.23	.28
No. 2, bgs ....lb.	21	.22	.21	.22	.21	.26
Powd, bbls ....lb.	.12½	.14	.12½	.14	.12	.16
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY ....lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases ....lb.	.17	.18	.17	.21	.15	.25
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	...	.18¼	.18¼	.18¾	.18¾	.19¼
Dark amber ....lb.	...	.07⅛	...	.07⅛	.07⅛	.08⅞
Light amber ....lb.	...	.11¼	...	.11¼	.11¼	.13¼
Copal, East India, 180 lb bgs						
Macassar pale bold ...lb.	...	.11⅜	...	.11⅜	.11⅜	.13
Chips ....lb.	...	.05⅜	...	.05⅜	...	.05⅜
Dust ....lb.	.03¼	.04	.03¼	.04	.03½	.04⅛
Nubs ....lb.	...	.09½	...	.09½	.09⅛	.10⅜
Singapore, Bold ....lb.	...	.14½	...	.14½	.14½	.15¼
Chips ....lb.	...	.06	.06	.06½	.04¾	.05⅜
Dust ....lb.	.03¼	.04	.03¼	.04	.03¼	.04⅛
Nubs ....lb.	...	.10	...	.10	.10	.10⅜
Copal Manila, 180-190 lb baskets, Loba A .....lb.	...	.10½	...	.10½	.10½	.12
Loba B ....lb.	...	.10¼	...	.10¼	.10¼	.11⅝
Loba C ....lb.	...	.09¾	...	.09¾	.09¾	.11¼
DBB ....lb.	...	.07⅞	...	.07⅞	.07⅞	.08¾
Dust ....lb.	...	.05⅛	...	.05⅛	.05⅛	.06⅝
MA sorts ....lb.	...	.05⅞	...	.05⅞	.05⅞	.07¼
Copal Pontianak, 224 lb cases, bold genuine ....lb.	...	.15¼	...	.15¼	.15¼	.16½
Chips ....lb.	...	.07¾	.07¾	.08¼	.08¼	.10¼
Mixed ....lb.	...	.14	...	.14	...	.14
Nubs ....lb.	...	.11	.11	.11⅜	.11⅜	.12⅞
Split ....lb.	...	.13⅛	.13⅛	.13½	.13½	.13⅞
Damar Batavia, 136 lb cases						
A ....lb.	...	.20	...	.20	.20	.25½
B ....lb.	...	.18½	..	.18½	.18½	.24
C ....lb.	...	.14⅞	...	.14⅞	.14⅞	.20⅜
D ....lb.	...	.13½	.13⅛	.13½	.13⅛	.17½
A/D ....lb.	...	.14½	...	.14½	.14½	.20⅜
A/E ....lb.	...	.12¼	...	.12¼	.12¼	.17¼
E ....lb.	...	.07⅜	...	.07⅜	.07⅜	.08½
F ....lb.	...	.07¼	...	.07¼	...	.07¼
Singapore, No. 1 .....lb.	...	.14¾	.14¾	.15¼	.15¼	.21⅛
No. 2 ....lb.	...	.10⅞	.10⅞	.11¼	.10⅜	.15⅜
No. 3 ....lb.	...	.05¼	...	.05¼	.05	.05¾
Chips ....lb.	...	.09¼	...	.09¼	.09¼	.13½
Dust ....lb.	...	.05¼	...	.05¼	.05	.05¾
Seeds ....lb.	...	.07⅜	...	.07⅜	.07⅜	.09½
Elemi, cns, c-l, ...lb.	...	.08⅛	...	.08⅛	.08⅛	.09½
Ester ....lb.	.06¼	.07	.06¼	.07	.06¼	.08½
Gamboge, pipe, cases .....lb.	.55	.60	.55	.60	.60	.80
Powd, bbls ....lb.	.60	.65	.60	.65	.65	.85
Ghatti, sol. bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs,...lb	.14½	.23	.14½	.23	...	..
Kauri, NY						
Brown XXX, cases ....lb.	.60	.60½	.60	.60½	.60	.60½
BX ....lb.	...	.38	...	.38	...	.38
B1 ....lb.	...	.28	...	.28	...	.28
B2 ....lb.	...	.24	...	.24	...	.24
B3 ....lb.	...	.18½	...	.18½	...	.18½
Pale XXX ....lb.	...	.61	...	.61	...	.61
No. 1 ....lb.	...	.41	...	.41	...	.41
No. 2 ....lb.	...	.24	...	.24	...	.24
No. 3 ....lb.	...	.17¾	...	.17¾	...	.17¾
Kino, tins ....lb.	2.50	2.75	2.50	2.75	2.00	2.75
Mastic ....lb.	.55	.56	.55	.56	.55	.56
Sandarac, prime quality, 200 lb bgs & 300 lb cks..lb.	.15	.19	.15	.20	.19	.26
Senegal, picked bags .... lb.	.25	.27	.25	.27	.23	.27
Sorts ....lb.	.09¼	.09½	.09¼	.09½	.09¼	.12
Thus, bbls ....280 lbs.	14.50	14.75	13.50	14.75	13.50	14.25
Tragacanth, No. 1, cases .lb.	2.25	2.35	2.25	2.45	2.40	3.00
No. 2 ....lb.	1.90	1.95	1.90	2.35	2.30	2.75
No. 3 ....lb.	1.60	1.65	1.60	1.95	1.90	2.70
Yacca, bgs ....lb.	.03½	.04½	.03½	.04½	.03½	.04½
H						
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.18	.34	.18	.34	.18	.34
Hemlock, 25%, 600 lb bbls.						
wks ....lb.	.03	.03¼	.03	.03¼	.03	.03¼
tks ....lb.	...	.02⅝	...	.02⅝	.02⅝	.02¾

HEYDEN

FORMALDEHYDE
U. S. P. Solution

Years of specialized experience — and knowledge of the needs of the consuming industries — are reflected in its uniformly dependable high purity and strength.

The fine Heyden quality is protected to the point of use by fast delivery in modern containers, including fleets of tank cars and tank trucks.

PARAFORMALDEHYDE
U. S. P. X.

A white powder of exceptionally good solubility.

HEXAMETHYLENETETRAMINE
U. S. P. and Technical

Available in both powdered and an inclusive range of granulations.

HEYDEN
CHEMICAL CORPORATION
50 UNION SQUARE, NEW YORK, N. Y.
CHICAGO BRANCH: 180 N. WACKER DR.
Factories: Garfield, N. J., Fords, N. J.

FINE HEYDEN CHEMICALS

Copper Fungicides

Widely and successfully used as spray or dust to control fungus diseases of fruit trees and vegetables.

FINEST
TC
TENNESSEE CORPORATION
QUALITY

Copper Sulphate

"Activating" element that builds up copper-deficient soils, stimulates growth. The product you need for homemade "Bordeaux."

Tri-Basic Copper Sulphate

Very effective in control of many plant and fruit diseases. 53% copper, easy to use as dust or spray.

Prompt Shipments on Receipt of Order

Zinc Sulphate

Acts as buffering agent, stimulates growth, and overcomes certain plant diseases. Completely soluble, high zinc content.

Manganese Sulphate

Increases yield, improves flavor and shipping qualities. Fertilizer Grade mixes well with other materials; Spray Grade finely ground, easily applied.

TENNESSEE CORPORATION
Atlanta, Ga., Lockland, Ohio
In Florida
U. S. Phosphoric Products Corporation, Tampa

Borax
BORIC ACID
Guaranteed 99½ to 100% Pure

20
TRADE MARK REG. U.S. PAT. OFF.

Borax Glass - Anhydrous Boric Acid
Manganese Borate - Ammonium Borate

Pacific Coast Borax Co.
51 Madison Avenue, New York
Chicago   Los Angeles

	Current		1939		1938	
		Market	Low	High	Low	High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks ......gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs ....lb.	.32	.33	.32	.36	.35	.36
Hexyl Acetate, secondary, delv, drs ....lb.	.13	.13½	.13	.13½	.13	.13½
tks ....lb.	...	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit	...	2.85	...	2.85	2.35	3.35
Hydrogen Peroxide, 100 vol, 140 lb cbys ....lb.	.19½	.20	.19½	.20	.19½	.20
Hydroxylamine Hydrochloride ....lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.16	.21	.16	.21	.16	.21
I						
Indigo, Bengal, bbls .....lb.	...	2.40	...	2.40	...	2.40
Synthetic, liquid ......lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars .lb.	...	1.75	...	1.75	1.50	1.75
Irish Moss, ord, bales ...lb.	.10	.11	.10	.11	.10	.11
Bleached, prime, bales lb.	.19	.20	.19	.20	.19	.20
Iron Acetate Liq. 17°, bbls delv ....lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls...100 lb.	2.32	3.11	2.32	3.11	2.32	3.11
Isobutyl Carbinol (128-132° C) drs, wks ....lb.	.33	.34	.33	.34	.33	.34
tks, wks ....lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd ....lb.	...	.0510	...	.0510	.0510	.05½
drs, frt all'd ....lb.	.061	.066	.061	.066	.061	.07
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast ....ton	22.00	85.00	22.00	85.00	22.00	85.00
L						
Lead Acetate, f.o.b. NY, bbls, White, broken ......lb.	...	.10	...	.10	.10	.11
cryst, bbls ....lb.	...	.10	...	.10	.10	.11
gran, bbls ....lb.	...	.10¾	...	.10¾	.10¾	.11¾
powd, bbls ....lb.	...	.10¾	...	.10¾	.10¾	.11¾
Arsenate, East, drs ...lb.	.11	.11½	.11	.11½	.11	.13½
Linoleate, solid, bbls...lb.	...	.19	...	.19	...	.19
Metal, c-l, NY .....100 lb.	...	5.10	...	5.10	4.00	5.10
Nitrate, 500 lb bbls, wks lb.	.10	.11½	.10	.11½	.10	.11½
Oleate, bbls ....lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_2O_4, delv ....lb.	...	.0735	.07¼	.08	.06½	.08
97% Pb_2O_4, delv ...lb.	...	.076	.07½	.076	.06¾	.081
98% Pb_2O_4, delv ...lb.	...	.0785	.07¾	.0785	.07	.0835
Resinate, precip, bbls ..lb.	...	.16½	...	.16½	...	.16½
Stearate, bbls ....lb.	.22	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b. wks, frt all'd ....lb.	.11	.11½	.11	.11½	.11	.11½
White, 500 lb bbls, wks lb.	...	.07	...	.07	.06	.07
Basic sulfate, 500 lb bbls, wks ....lb.	...	.06¼	...	.06¼	.05¼	.06¼
Lime, chemical quicklime, f.o.b., wks, bulk ...ton	7.00	8.00	7.00	8.00	7.00	8.00
Hydrated, f.o.b. wks...ton	8.50	12.00	8.50	12.00	8.50	12.00
Lime Salts, see Calcium Salts						
Lime sulfur, dealers, tks..gal.	.08	.11½	.08	.11½	.08	.11½
drs ....gal.	.11	.16	.11	.16	.11	.16
Linseed Meal, bgs ......ton	...	41.50	41.50	42.00	39.00	45.00
Litharge, coml, delv, bbls.lb.	...	.0635	.06¼	.0635	.05½	.066
Lithopone, dom, ordinary, delv, bgs ....lb.	...	.04⅛	...	.04⅛	.04⅛	.04⅝
bbls ....lb.	...	.04⅜	...	.04⅜	.04⅜	.04⅞
High strength, bgs ....lb.	...	.05⅝	...	.05⅝	.05⅝	.06⅛
bbls ....lb.	...	.05⅞	...	.05⅞	.05⅞	.06⅜
Titanated, bgs ....lb.	...	.05⅝	...	.05⅝	.05⅝	.06⅛
bbls ....lb.	...	.05⅞	...	.05⅞	.05⅞	.06⅜
Logwood, 51°, 600 lb bbls lb.	.09½	.11½	.09½	.11½	.09½	.11½
Solid, 50 lb boxes .....lb.	.15	.19	.15	.19	.15	.19
Sticks ....ton	24.00	25.00	24.00	25.00	24.00	25.00
M						
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks ....lb.	.05¾	.06½	.05¾	.06½	.05¾	.07
Chloride flake, 375 lb drs, c-l, wks ....ton	39.00	42.00	39.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks ....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech, heavy bbls, frt all'd .....lb.	.25	.30	.25	.30	.25½	.30½
Light, bbls above basis lb.	.20	.25	.20	.25	.20	.25½
USP Heavy, bbls, above basis ....lb.	.25	.30	.25	.30	.25	.30½
Palmitate, bbls ....lb.	.33	nom.	.33	nom.	...	.33
Silicofluoride, bbls ....lb.	.09½	.10½	.09½	.10½	.09½	.10½
Stearate, bbls ....lb.	.21	.24	.21	.24	.21	.24
Manganese acetate, drs...lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ...lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bags, c-l ......ton	...	47.50	...	47.50	47.50	62.50
Hydrate, bbls ....lb.	...	.32	...	.32	...	.32
Linoleate, liq, drs .....lb.	.18	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls ...lb.	...	.19	...	.19	...	.19
Resinate, fused, bbls...lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ....lb.	...	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs ...lb.	.07	.07½	.07	.07½	.07	.07½

	Current	Market	1939 Low	1939 High	1938 Low	1938 High
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ....ton	...	23.25	23.00	23.25	23.00	24.50
Mannitol, pure cryst, cs,wks lb.	1.15	1.20	1.15	1.20	1.15	1.45
Marble Flour, blk ......ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride(Calomel) lb.	...	1.36	...	1.36	1.18	1.59
Mercury metal...76 lb. flasks	80.00	81.00	80.00	81.00	73.00	84.50
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.45	1.55	1.45	1.55	1.45	1.55
Meta-phenylene diamine 300 lb bbls ....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine 300 lb bbls ....lb.	.65	.67	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l, frt all'd ....gal.	...	.46	.41	.46	.30	.41
tks, frt all'd ....gal.	...	.40	.35	.40	.25	.35
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	.38
tks ....gal.	...	.33	...	.33	...	.33
95%, tks ....gal.	...	.31	...	.31	...	.31
97%, tks ....gal.	...	.32	...	.32	...	.32
Methyl Acetate, tech, tks, delv ....lb.	...	.06½	...	.06½	...	.06½
55 gal drs, delv .....lb.	.07½	.08	.07½	.08	.07½	.08
C.P. 97-99%, tks, delv lb.	...	.06¼	...	.06¼	.06¼	.07
55 gal drs, delv ....lb.	.07¼	.07¾	.07¼	.07¾	.07¼	.08½
Acetone, frt all'd, drs gal. *p*	.30	.36	.30	.36	.30	.40½
tks, frt all'd, drs ..gal. *p*	.25	.29	.25	.29	.25	.32½
Synthetic, frt all'd, east of Rocky M., drs ....gal. *p*	.38	.41	.38	.41	.38	.51
tks, frt all'd ...gal.	...	.31½	...	.31½	.31½	.39½
West of Rocky M., frt all'd, drs ..gal. *p*	...	.42	...	.42	.42	.46
tks, frt all'd...gal. *p*	...	.35	...	.35	.35	.39½
Anthraquinone ....lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks .....lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl .....lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.05	...	.05	.05	.06
50 gal drs, frt all'd c-l lb.	...	.06	...	.06	.06	.07
Formate, drs, frt all'd..lb.	.35	.36	.35	.36	.35	.36
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ..lb.	...	.30	...	.30	...	.30
Propyl carbinol, drs ...lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	...	30.00	...	30.00	30.00	35.00
Michler's Ketone, kgs....lb.	...	2.50	...	2.50	...	2.50
Monoamylamine, c-l,drs,wks lb.	.52	1.00	.52	1.00	.52	1.00
Monobutylamine, lcl, drs, wks ....lb.	...	.65	...	.65	...	.65
Monochlorobenzene, see Chlorobenzene, mono						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	...	.23
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparaminosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls lb.	.03¾	.04¼	.03¾	.04¼	.03¾	.04¼
50% Solid, 50 lb boxes lb.	.04⅜	.05	.04⅜	.05	.04⅜	.06¼
J1 bgs ....ton	...	25.00	24.00	25.00	23.50	30.00
J2 bgs ....ton	...	17.00	...	17.00	17.00	22.00
R2 bgs ....ton	...	17.25	...	17.25	17.00	22.00

N

	Current	Market	1939 Low	1939 High	1938 Low	1938 High
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.26	...	.26	.26	.31
drs, c-l ....gal.	...	.31	...	.31	.31	.36
Naphthalene, dom, crude bgs, wks ....lb.	2.25	2.85	2.25	2.85	2.25	2.85
Imported, cif, bgs ...lb.	...	1.60	1.60	1.85	1.40	2.25
Balls, flakes, pks ......lb.	...	.06½	...	.06½	.06½	.08
Balls, ref'd, bbls, wks ..lb.	...	.05¾	...	.05¾	.05¾	.07¼
Flakes, ref'd, bbls, wks lb.	...	.05¾	...	.05¾	.05¾	.07¼
Nickel Carbonate, bbls ..lb.	.36	.37½	.36	.37½	.36	.37½
Chloride, bbls ....lb.	.18	.20	.18	.20	.18	.20
Metal ingot ....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY .lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ....lb.	...	.76	...	.76	...	.76
Nitre Cake, blk ....ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, redistilled, 1000 lb drs, wks ....lb.	.08	.10	.08	.10	.08	.10
tks ....lb	...	.07½	...	.07½	...	.07½
Nitrocellulose, c-l, l-c-l, wks lb.	.22	.29	.22	.29	.22	.29
Nitrogen Sol. 45½% ammon., f.o.b. Atlantic & Gulf ports tks, unit ton	...	1.04	...	1.04	1.01	1.04
Nitrogenous Mat'l, bgs, imp unit	...	2.50	...	2.50	2.35	2.65
dom, Eastern wks ...unit	...	2.50	...	2.50	2.50	2.75
dom, Western wks ...unit	...	2.20	2.20	2.25	2.20	2.35
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ....lb.	...	.23	...	.23	.23	.23

O

	Current	Market	1939 Low	1939 High	1938 Low	1938 High
Oak Bark Extract, 25%, bbls lb.	...	.03⅛	...	.03⅛	...	.03⅛
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	.16	.17

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

TURNER Chemicals are backed by 75 years of experience—insuring you a uniform product of the highest standard—yet priced to meet competition.

Caustic Potash
Caustic Soda
Potassium Carbonate
Oxalic Acid
Phosphorus Compounds
Sodium Chlorate
Bleaching Powder
Persulphate of Ammonia
Persulphate of Potash
Aluminum Stearate
Calcium Stearate
Zinc Stearate U. S. P.
White Oils
Petrolatum
Insecti-Sol
(Colorless, Odorless Insecticide Base)

LIQUID CAUSTIC SODA

We maintain local delivery tank truck service throughout the Metropolitan New York area.

JOSEPH TURNER & CO.
RIDGEFIELD, NEW JERSEY

83 Exchange Pl., Providence, R. I.; 630 Fifth Ave., New York, N. Y.
40th St. & Calumet Ave., Chicago, Ill.

Serving the Chemical Industry for over 75 years

CHEMICALS

VICTOR FABRICS

Acidproof Filter Cloth: Ask for samples of our "DuraKlad" Filter Cloth. Guaranteed to withstand concentrated solutions of nearly all organic acids. Strong and durable . . . made in various weaves and widths. Something new . . . of interest to your chemical engineer.

Cotton Filter Fabrics, All Weaves By the roll or cut and strongly sewed; portholes overcast, to properly fit your press or rotary filter.

Fume Bags

Gravity Filter Bags

Dust Arrestor Tubes

Blankets For rotary filters. All types and sizes.

Wool Filter Cloth

WRITE FOR SAMPLES AND PRICES

Kindly state width and weave required.

William W. Stanley Co., Inc.

401 Broadway New York, N. Y.

FACTORY, VICTOR, N. Y.

GREEFF

Industrial and Pharmaceutical Chemicals

ACETONE

CHEMICALLY PURE

Stocks are available for immediate delivery, in either tank cars or drums. Ample supplies of Acetone in our New York and Chicago warehouses insure rapid service on drum shipments. Tank car shipments from California plant.

•

Selling Agents for Shell Chemical Company

R.W. GREEFF & CO.

10 East 40th Street, New York

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Orange-Mineral, 1100 lb cks NY . . . lb.	. . .	.10¼	. . .	.10¼	.09½	.10½
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.70	.74
Orthochlorophenol, drs . . . lb.	. . .	.32	. . .	.32	.32	.75
Orthocresol, drs, wks . . . lb.	.16½	.17½	.16½	.17½	.13½	.17½
Orthodichlorobenzene, 1000 lb drs . . . lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks . . . lb.	.15	.18	.15	.18	.15	.18
Orthonitroparachlorphenol, tins . . . lb.	. . .	.75	. . .	.75	. . .	.75
Orthonitrophenol, 350 lb drs . . . lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs. wks . . . lb.	.08	.10	.08	.10	.08	.10
Orthotoluidine, 350 lb bbls, l-c-l . . . lb.	.16	.17	.16	.17	.16	.17
Osage Orange, cryst, bbls lb.	.17	.25	.17	.25	.17	.25
51° liquid . . . lb.	.07	.08	.07	.08	.07	.08
P						
Paraffin, rfd, 200 lb bgs						
122-127° M P . . . lb.	.03¾	.039	.03¾	.039	.03¾	.04½
128-132° M P . . . lb.	.04	.0435	.04	.0435	.04	.049
133-137° M P . . . lb.	. . .	.0465	. . .	.0465	.0465	.05¾
Para aldehyde, 99%, tech, 110-55 gal drs, delv . . lb.	. . .	.16	. . .	.16	.16	.18
Aminoacetanilid, 100 lb kgs . . . lb.	. . .	.85	. . .	.85	. . .	.85
Aminohydrochloride, 100 lb kgs . . . lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	. . .	1.05	. . .	1.05	. . .	1.05
Chlorophenol, drs . . . lb.	.30	.45	.30	.45	.30	.45
Dichlorobenzene, 200 lb drs, wks . . . lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls . . . lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks . . . lb.	.45	.47	.45	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks . . . lb.	.15	.16	.15	.16	.15	.16
Nitro-orthotoluidine, 300 lb bbls . . . lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls . . . lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	. . .	.35	. . .	.35	. . .	.35
Phenylenediamine, 350 lb bbls . . . lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls. . . . lb.	.70	.75	.70	.75	.70	.75
tks, wks . . . lb.	. . .	.31	. . .	.31	. . .	.31
Toluenesulfonchloride, 410 lb bbls, wks . . . lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks . . . lb.	.56	.58	.56	.58	.56	.58
Paris Green, dealers, drs lb.	.23	.26	.23	.26	.23	.26½
Pentane, normal, 28-38° C, group 3, tks . . . gal.	. . .	.08½	. . .	.08½	. . .	.08½
drs, group 3 . . . gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 100 lb drs, frt all'd . . . lb.	. . .	.10½	. . .	.10½	. . .	.10½
Petrolatum, dark amber, bbls . . . lb.	.02⅝	.02¾	.02⅝	.02¾	.02⅝	.03⅞
Light, bbls . . . lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls . . . lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls . . . lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls . . . lb.	.02½	.03⅝	.02½	.03⅝	.02½	.03⅝
White, lily, bbls . . . lb.	.05¼	.07⅛	.05¼	.07⅛	.05¼	.07⅛
White, snow, bbls . . . lb.	.06¼	.08⅛	.06¼	.08⅛	.06¼	.08⅛
Petroleum Ether, 30-60°, group 3, tks . . . gal.	. . .	.13	. . .	.13	. . .	.13
drs, group 3 . . . gal.	.14	.17	.14	.17	.14	.17
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3 tks, wks . . . gal.	.06⅜	.06⅝	.06⅜	.06⅝	.06⅜	.07⅜
East Coast, tks, wks gal.	. . .	.10	. . .	.10	. . .	.10
Hydrogenated, naphthas, frt all'd East, tks . . . gal.	. . .	.16	. . .	.16	. . .	.16
No. 2, tks . . . gal.	. . .	.18	. . .	.18	. . .	.18
No. 3, tks . . . gal.	. . .	.16	. . .	.16	. . .	.16
No. 4, tks . . . gal.	. . .	.18	. . .	.18	. . .	.18
Lacquer diluents, tks, Bayonne . . . gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks . . . gal.	.07⅜	.07⅝	.07⅜	.07⅝	.07⅜	.08⅜
Naphtha, V.M.P., East, tks wks . . . gal.	. . .	.10	.10	.10	.09½	.10
Group 3, tks, wks . . gal.	.06⅜	.06⅝	.06⅜	.06⅝	.06⅜	.07⅜
Petroleum thinner, 43-47, East, tks, wks . . . gal	.09½	.10	.09½	.10	.08½	.10
Group 3, tks, wks . . gal.	.05⅜	.05⅝	.05⅜	.05⅝	.05⅜	.06⅜
Rubber Solvents, stand grd East, tks, wks . . . gal.	.09½	.10	.09½	.10	.09½	.10
Group 3 tks, wks . . . gal.	.06⅜	.06⅝	.06⅜	.06⅝	.06⅜	.07⅜
Stoddard Solvent, East, tks, wks . . . gal	. . .	.10	. . .	.10	.09½	.10
Group 3, tks, wks . . gal.	.05⅞	.06⅛	.05⅞	.06⅛	.05⅞	.06⅞
Phenol, 250-100 lb drs . . . lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks . . . lb.	. . .	.13½	. . .	.13½	. . .	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs . . . lb.	. . .	1.35	. . .	1.35	. . .	1.35
Phenyl Chloride, drs . . . lb.	. . .	.17	. . .	.17	. . .	.17
Phenylhydrazine Hydrochloride, com . . . lb.	. . .	1.50	. . .	1.50	. . .	1.50

Current

Phloroglucinol
Rosin Oil

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Phloroglucinol, tech, tins . . lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins . . . . lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ton	. . .	1.85	. . .	1.85	. . .	1.85
70% basis . . . . ton	. .	2.35	. . .	2.35	. . .	2.35
72% basis . . . . ton	. . .	2.85	. . .	2.85	. . .	2.85
75-74% basis . . . . . . ton	. . .	3.85	. . .	3.85	. . .	3.85
75% basis . . . . ton	. . .	5.50	. . .	5.50	. . .	5.50
Tennessee, 72% basis . . ton	. . .	4.50	. . .	4.50	. . .	4.50
Phosphorus Oxychloride 175 lb cyl . . . . lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases . . . . lb.	40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs . . lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl . . . . . . lb.	.15	.18	.15	.18	.15	.18
Yellow, 110 lb cs, wks . lb.	.24	.30	.24	.30	.24	.30
Phthalic Anhydride, 100 lb drs, wks . . . . lb.	. . .	.14½	. . .	.14½	. . .	.14½
Pine Oil, 55 gal drs or bbls						
Destructive dist . . . . . . lb.	46	.48	.46	.48	.46	.55
Steam dist wat wh bbls gal.	. . .	.59	. . .	.59	. . .	.59
tks . . . . gal.	. . .	.54	. . .	.54	. . .	.54
Pitch Hardwood, wks . . . ton	18.25	18.75	18.25	18.75	18.25	18.75
Coaltar, bbls, wks . . . . ton	. . .	19.00	. . .	19.00	. . .	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.05½	.06½	.05½	.06½
Imported . . . . lb.	.15	.16	.15	.16	.15	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls . . . . bbl.	6.00	6.25	6.00	6.25	5.75	6.25
Stearin, drs . . . . lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd . . . . oz.	32.00	35.00	32.00	35.00	30.00	39.00
POTASH						
Potash, Caustic, wks, sol . . lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake . . . . lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks . . . . lb.	. . .	.02⅞	. . .	.02⅞	. . .	.02⅞
Manure Salts, imported 30% basis, blk . . . . unit	. . .	.58½	. . .	.58½	. . .	.58½
Potassium Abietate, bbls . . lb.	. . .	.09	. . .	.09	.08	.13
Acetate, tech, bbls, delv lb.	. . .	.26	. . .	.26	.26	.28
Bicarbonate, USP, 320 lb bbls . . . . lb.	. . .	.18	. . .	.18	. . .	.18
Bichromate Crystals, 725 lb cks* . . . . lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09¼
Binoxalate, 300 lb bbls . . lb.	. . .	.23	. . .	.23	. . .	.23
Bisulfate, 100 lb kgs . . . . lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks . . . . lb.	.06½	.07	.06½	.07	.06½	.07
liquid, tks . . . . lb.	. . .	.02⅞	. . .	.02⅞	. . .	.02⅞
drs, wks . . . . lb.	.03	.03½	.03	.03½	.03	.03½
Chlorate crys, 112 lb kgs, wks . . . . lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs . . . . lb.	.12	.13	.12	.13	.12	.13
powd, kgs . . . . lb.	.08½	.08¾	.08½	.08¾	.08½	.08¾
Chloride, crys, bbls . . . . lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs . . . . lb.	.19	.28	.19	.28	.19	.28
Cyanide, 110 lb cases . . . lb.	.50	.55	.50	.55	.50	.57½
Iodide, 250 lb bbls . . . . lb.	. . .	1.13	. . .	1.13	.93	1.13
Metabisulfite, 300 lb bbls lb.	.12	.13½	.12	.13½	.12	.15
Muriate, bgs, dom, blk unit	. . .	.53½	. . .	.53½	. . .	.53½
Oxalate, bbls . . . . lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks . . . lb.	.09	.10½	.09	.10½	.09	.11½
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls . . . . lb.	.30½	.34	.30½	.34	.30½	.37
Yellow, bbls . . . . lb.	.14	.15	.14	.16	.15	.16
Sulfate, 90% basis, bgs ton	. . .	38.00	. . .	38.00	. . .	38.00
Titanium Oxalate, 200 lb bbls . . . . lb.	.35	.40	.35	.40	.35	.40
Pot & Mag Sulfate, 48% basis bgs . . . . ton	. . .	25.75	. . .	25.75	. . .	25.75
Propane, group 3, tks . . . . lb.	.03	.04⅜	.03	.04⅜	.03	.04⅜
Putty, coml, tubs . . . 100 lb.	. . .	3.00	. . .	3.00	2.25	3.00
Linseed Oil, kgs . . . . 100 lb.	. . .	4.50	. . .	4.50	4.00	4.65
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd . . . . gal.	. . .	5.75	5.75	5.75	5.00	6.75
3.6% pyrethrins, drs, frt all'd . . . . gal.	. . .	8.45	8.45	8.45	7.65	9.95
Flowers, coarse, Japan, bgs . . . . lb.	.26½	.27	.26	.27	.18	.28½
Fine powd, bbls . . . . . lb.	27½	.28	.27	.28	.19	.30
Pyridine, denat, 50 gal drs gal.	. . .	1.63	. . .	1.63	1.53	1.63
Refined, drs . . . . lb.	. . .	.50	. . .	.50	.45	.50
Pyrites, Spanish cif Atlantic ports, blk . . . . unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Q						
Quebracho, 35% liq tks . . lb.	. . .	.03⅜	.03	.03⅜	.03	.03⅜
450 lb bbls, c-l . . . . . . lb.	. . .	.04	.04	.04⅛	.03½	.04⅛
Solid, 63%, 100 lb bales cif . . . . lb.	. . .	.04	. . .	.04	. . .	.04
Clarified, 64%, bales . . lb.	. . .	.04¼	. . .	.04¼	. . .	.04¼
Quercitron, 51 deg liq, 450 lb bbls . . . . lb	.07½	.08½	.07½	.08½	.06	.08½
Solid, drs . . . . lb.	.10	.12	.10	.12	.10	.12
R						
R Salt, 250 lb bbls, wks . lb.	.52	.55	.52	.55	.52	.55
Resorcinol tech, cans . . . . . lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst . . . . . lb.	.18¾	.19¼	.17¾	.19¼	.15	.18¼
Powd, bbls . . . . lb.	.17¾	.18¼	.16¾	.18¼	.16	.18½
Rosin Oil, bbls, first run gal.	.45	.47	.45	.47	.45	.60
Second run . . . . gal.	.47	.49	.47	.49	.47	.62
Third run, drs . . . . gal.	.51	.53	.51	.53	.51	.66

* Spot price is ⅛c higher.

Phosphorus Trichloride

PCl_3

. . . made to rigid standards of purity, assuring dependability.

. . . used in organic synthesis for the introduction of halogens either directly or catalytically and in the preparation of organic phosphorus compounds.

. . . shipped in steel-jacketed lead carboys or in lead-lined drums.

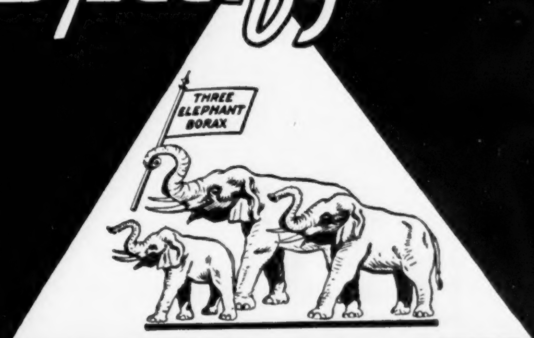
Our forty years of experience in the manufacture of phosphorus and its compounds is your security, both as to the product and its source. Inquiries are invited.

Oldbury Electro-Chemical Company

Plant and Main Office:
Niagara Falls, New York
New York Office: 22 E. 40th St., New York

Phosphorus and phosphorus products. Sodium chlorate. Potassium perchlorate. Oxalic acid.

Specify



THREE ELEPHANT

BORAX-BORIC ACID

POTASH
TRONA
SALTS

MURIATE OF POTASH

Stocks carried in principal cities of United States and Canada

AMERICAN POTASH & CHEMICAL CORP.

70 PINE STREET NEW YORK

SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.
REG. U.S. PAT. OFF.
MURIATE OF POTASH
62/63% K₂O, ALSO 50% K₂O
MANURE SALTS
APPROXIMATELY 30% K₂O
UNITED STATES POTASH COMPANY
INCORPORATED
30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

TECHNICAL
U.S.P.
RESORCIN
WRITE for PRICES
C. P.
CATECHOL
Resublimed Crystals
PENNSYLVANIA COAL PRODUCTS CO.
Est. 1916 PETROLIA, PA.

TARTARS
TARTARIC ACID
ROCHELLE SALT
CREAM TARTAR
Murray Hill 6-1990
441 LEXINGTON AVE NEW YORK
Wm. NEUBERG Inc.

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	4.90	4.90	5.10	4.65	6.00
D	...	5.20	5.20	5.30	4.75	6.00
E	...	5.35	5.35	5.40	4.90	6.00
F	...	5.65	...	5.65	5.05	7.00
G	...	6.42½	5.75	6.42½	5.25	7.05
H	...	6.45	5.75	6.45	5.25	7.15
I	...	6.55	5.77½	6.55	5.25	7.15
K	...	6.55	5.80	6.55	5.25	7.25
M	...	6.65	5.90	6.65	5.25	7.40
N	...	7.10	6.90	7.10	6.20	7.50
WG	...	7.40	7.30	7.40	6.75	8.45
WW	...	8.05	7.95	8.05	7.55	9.15
Rosins, Gum, Savannah (280 lb unit):**						
B	...	3.50	3.50	3.75	3.25	4.60
D	...	3.80	3.80	4.00	3.50	4.60
E	...	3.95	3.95	4.10	3.55	4.60
F	...	4.25	4.25	4.30	3.90	5.60
G	...	5.02½	4.40	5.02½	4.10	5.65
H	...	5.10	4.40	5.10	4.20	5.75
I	...	5.15	4.40	5.15	4.20	5.85
K	...	5.15	4.40	5.15	4.20	6.00
M	...	5.25	4.40	5.25	4.20	6.15
N	...	5.70	5.35	5.70	4.80	6.20
WG	...	6.00	5.80	6.00	5.40	7.05
WW	...	6.65	6.30	6.65	6.10	7.75
X	...	6.65	6.30	6.65	6.10	7.75
Rosin, Wood, c-l, FF grade, NY	4.00	5.25	5.35	5.25	5.05	6.40
Rotten Stone, bgs mines ..ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls ..lb.	...	.12	...	.12	...	.12
Powdered, bbls ......lb.	.08½	.10	.08½	.10	.08½	.10
S						
Sago Flour, 150 lb bgs...lb.	.02½	.03½	.02½	.03½	.02½	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, wks ton	19.00	25.00	19.00	25.00	19.00	23.00
Chrome, c-l, wks .....ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls ....lb.	.06½	.069	.06½	.069	.06½	.069
Cryst, bbls ....lb.	.07½	.0865	.07½	.0865	.07½	.0865
Powd, bbls ....lb.	.07½	.079	.07½	.079	.07½	.079
Satin, White, pulp, 550 lb bbls ....lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs .....lb.	.46	.48	.46	.48	.46	.48
Shellac, Bone dry, bbls ..lb. r	.19	.20	.19	.20	.16½	.20
Garnet, bgs ....lb.	.12½	.13	.12½	.13	.12½	.15
Superfine, bgs ....lb. s	.11	.11½	.11	.11½	.11	.13½
T. N., bgs ....lb. s	.10½	.11	.10½	.11	.10½	.12½
Silver Nitrate, vials .....oz.	.31½	.33½	.31½	.33½	.33½	.34⅞
Slate Flour, bgs, wks...ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs .....100 lb.	...	1.08	...	1.08	...	1.08
blk ....100 lb.	...	.90	...	.90	...	.90
paper bgs ....100 lb.	...	1.05	...	1.05	...	1.05
bbls ....100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs ....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ....100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks ..100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs ....lb.	...	.11	...	.11	.10	.13
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks ....lb.	.04	.05	.04	.05	.04	.05
anhyd, drs, delv .....lb.	...	.08¼	...	.08¼	...	.08¼
Alginate, drs ....lb.	...	.70	...	.70	.69	.70
Antimoniate, bbls ......lb.	.12	.12½	.12	.12½	.12	.15¼
Arsenate, drs ....lb.	.08	.08½	.08	.08½	.08	.08½
Arsenite, liq, drs .....gal.	.30	.33	.30	.33	.30	.33
Dry, gray, drs, wks ..lb.	.07½	.09½	.07½	.09½	.07½	.09½
Benzoate, USP kgs ...lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks ....100 lb.	...	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks*	.06¾	.07¼	.06¾	.07¼	.06¾	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.14	.15	.14	.15	.14	.17½
Diacetate, 33-35% acid, bbls, lcl, delv ......lb.	...	.09	...	.09	...	.09
Fluoride, white 90%, 300 lb. bbls, wks ....lb.	.07½	.08¼	.07½	.08¼	.07½	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	...	2.80	2.50	2.80
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.45	2.80	2.45	2.80	2.40	2.80
Iodide, jars ....lb.	...	2.10	...	2.10	1.90	2.10
Metal, drs, 280 lbs ....lb.	...	.19	...	.19	...	.19
Metanilate, 150 lb bbls ..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ....100 lb.	...	2.20	...	2.20	2.15	2.20
cryst, drs, c-l, wks 100 lb.	...	2.90	...	2.90	2.75	2.90
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.023
Naphthenate, drs ....lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher. ** Dec. 23.

Current

Sodium Nitrate
Tar Acid Oil

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Sodium (continued):						
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ....ton	...	28.30	...	28.30	...	28.30
100 lb bgs ....ton	...	29.00	...	29.00	...	29.00
Bulk ....ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls lb.	.06¾	.11½	.06¾	.11½	.06¾	.11½
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c.l. ....lb.	...	2.90	2.90	2.90	2.90	2.90
Perborate, drs, 400 lbs..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.05	...	2.05	...	2.05
bgs, wks ......100 lb.	...	1.85	...	1.85	...	1.85
Tri-sodium, tech, 325 lb bbls, wks ......100 lb.	...	2.20	...	2.20	...	2.20
bgs, wks ......100 lb.	...	2.00	...	2.00	...	2.00
Picramate, 160 lb kgs..lb.	.65	.67	.65	.67	.65	.67
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.09½	.10	.09½	.10	.09	.11½
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.0530	...	.0530	.0530	.10
Sesquisilicate, drs, c-l, wks ....100 lb.	...	2.80	...	2.80	2.80	3.00
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°,55 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ......100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.04½	.04¾	.04½	.04¾	.04¾	.06½
Stannate, 100 lb drs ...lb.	.30½	.33½	.30	.34	.25½	.34
Stearate, bbls ....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks .100 lb. †	1.45	1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
Solid, 650 lb drs, c-l, wks ....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs .....lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls...lb.	...	.12	...	.12	...	.12
Tungstate, tech, crys, kgs lb.	1.05	1.10	1.05	1.10	1.05	1.35
Sorbitol, com, solut, wks c-l, drs, wks ....lb.	...	.15½	...	.15½	.15½	.19
Spruce Extract, ord, tks..lb.	...	.01⅛	...	.01⅛	...	.01⅛
Ordinary, bbls ....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, tks ..lb.	...	.01⅜	...	.01⅜	...	.01⅜
Super spruce ext, bbls lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	2.60	2.80	2.50	2.80	2.40	3.18
Powd, 140 lb bgs ..100 lb.	2.70	2.90	2.60	2.90	2.50	3.28
Potato, 200 lb bgs .....lb.	.04	.05	.04	.05	.03½	.05½
Imp, bgs ....lb.	.05	.06	.05	.06	.05	.06
Rice, 200 lb bbls ......lb.	.06¼	.07¼	.06¼	.07¼	.06¼	.07¼
Wheat, thick, bgs .... lb.	.05	nom.	.05	.05½	.06¼	.07
Strontium carbonate, 600 lb bbls, wks ....lb.	.16½	.17½	.16½	.17½	.16½	.17
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¼	.07¾	.08¼	.07¾	.09¼
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	...	.45	...	.45	...	.45
tech, bbls, wks ....lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	16.00	19.00
Flour, coml, bgs ...100 lb.	1.65	2.35	1.65	2.35	1.65	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs ....100 lb.	2.85	3.00	2.85	3 00	2.85	3.00
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ......100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.03	.04	.03	.04	.03	.04
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks ...lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks ....lb.	.04	.05	.04	.05	.04	.05
Refrigeration, cyl, wks lb.	.16	.17	.16	.17	.16	.17
Multiple units, wks ...lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton		66.00	66.00	67.00	62.00	68.00
Extract, 42°, bbls ....lb.	.05¼	.06¼	.05¼	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ....ton	...	8.00	...	8.00	8.00	9.00
Run of pile ....ton	...	7.50	...	7.50	7.50	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit .....ton	...	.70	...	.70	.70	.85
T						
Talc, Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	23.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	62.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	70.00
Tankage Grd, NY ...unit ¤	...	3.25	3.15	3.25	2.50	3.15
Ungrd ....unit ¤	...	3.35	3.00	3.35	2.35	3.00
Fert grade, f.o.b. Chgo unit ¤	...	3.50	3.00	3.50	2.25	3.00
South American cif unit ¤	...	3.15	3.15	3.35	3.00	3.45
Tapioca Flour, high grade, bgs ....lb.	.02	.05½	.02	.05½	.02	.05½
Tar Acid Oil, 15%, drs..gal.	.21	.24	.21	.24	.21	.25½
25%, drs ....gal.	.25	.28	.25	.28	.25	.29½

† Bags 15c lower; ¤ + 10; * Bbls. are 20c higher.

Ready to Serve

at all times — in all places
everything for refrigeration

BOWER BRAND
AMMONIA

ANHYDROUS • AQUA
CALCIUM CHLORIDE
CORROSION RETARDER

Est. 1858

Write for descriptive literature

HENRY BOWER CHEMICAL
MANUFACTURING COMPANY
29th & GRAY'S FERRY ROAD
PHILADELPHIA, PA.

SULPHUR
CRUDE 99½% PURE

Free from arsenic, selenium and tellurium

WE...
respectfully
solicit your
inquiries...

MINES—Clemens, Brazoria County, Texas.

For convenience of Buyers,
we are now carrying stocks at Baltimore.

JEFFERSON LAKE OIL CO., INC.
SUITE 1406-9, WHITNEY BLDG., NEW ORLEANS, LA.

ESTABLISHED 1880

WM. S. GRAY & CO.

342 MADISON AVE.
NEW YORK

Cable Address: Graylime

Phone: Vanderbilt 3-0500

Manufacturers' Agents

ACETIC ACID

All Grades

Tank Cars — Barrels

Inquiries Solicited

HYDRION

Wide Range pH Test Paper

Used like litmus, HYDRION test papers show a color change for each pH unit throughout the range pH 1 to pH 14. HYDRION is economical to use, rapid, and is accurate to within 0.5 pH units.

Write for complimentary color chart and descriptive literature.

R. P. CARGILLE

118 Liberty Street, New York City

EVERYWHERE IN THE WORLD
PETROMETERS
INDICATE EVERY KIND OF LIQUID
PETROMETERS
INDICATE IN EVERY TYPE OF TANK
PETROMETERS
BUY BUY BUY
PETROMETERS
FOR THE BEST INSTALLATION
PETROMETER CORPORATION
5 STAR SQ. LONG ISLAND CITY NEW YORK

	Current	Market	1939 Low	1939 High	1938 Low	1938 High
Tar, pine, delv, drs .....gal.	...	.26	...	.26	...	.26
tks, delv, E. cities ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls lb.	.27¾	.28	.27¾	.28	.26¾	.28
USP, bbls ....lb.	.33	.33½	.33	.33½	.32	.33½
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene,drs,tech lb.	...	.09½	...	.09½	...	.09½
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbls lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.35½	.36	.35½	.36	.31	.36½
Metal, NY ....lb.	...	.4520	.4520	.4665	.3570	.4675
Oxide, 300 lb bbls, wks lb.	.50	52	.50	.52	.44	.50
Tetrachloride, 100 lb drs, wks ....lb.	...	.23¼	.23¼	.23½	.18½	.23½
Titanium Dioxide, 300 lb bbls lb.	.14½	.16	.14½	.16	.14½	.17
Barium Pigment, bbls..lb.	.05⅝	.05⅞	.05⅝	.05⅞	.05⅝	.06¼
Calcium Pigment, bbls..lb.	.05⅝	.05⅞	.05⅝	.05⅞	.05⅝	.06¼
Toluidine, mixed, 900 lb drs, wks ....lb.	.26	.27	.26	.27	.26	.27
Toluol, 110 gal drs, wks..gal.	...	.27	...	.27	.27	.35
8000 gal tks, frt all'd..gal.	...	.22	...	.22	.22	.30
Toner Lithol, red, bbls...lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls ....lb.	.75	.80	.75	.80	.75	.80
Toluidine, bgs ....lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	...	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	.27
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	.77	1.25
Tributylamine, lcl, drs, wks lb.	...	.70	...	.70	...	.70
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	.45
Tributyl Phosphate, frt all'd lb.	...	.42	...	.42	.42	.50
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts..lb.	.09	.09½	.09	.09½	.089	.09½
Tricresyl phosphate, tech, drs lb.	.23	.37½	.23	.37½	.23	.39
Triethanolamine, 50 gal drs wks ....lb.	.21	.22	.21	.22	.21	.22
tks, wks ....lb.	...	.20	...	.20	...	.20
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ....lb.	...	.30	...	.30	...	.30
Stearate, bbls ....lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl f.o.b. dest ....lb.	...	.50	...	.50	...	.50
Trimethylamine, c-l, drs, frt all'd E. Mississippi ....lb.	...	1.00	...	1.00	...	1.00
Triphenylguanidine ......lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs..lb.	...	.38	...	.38	.34	.38
Tripoli, airfloated, bgs, wks ton	26.00	30.00	26.00	30.00	26.00	30.00
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.32¾*	.29½	.32¾	.26½	.31½
Savannah, bbls ....gal.	...	.26¾*	.24	.26¾	.20½	.30¾
Jacksonville, bbls .....gal.	...	.26¾*	.23½	.26¾	.20½	.30¾
Wood Steam dist, bbls, c-l, NY ....gal.	.27	.30	24.2	.30	24.2	.31
Wood, dest dist, c-l, drs, delv E. cities ......gal.	.22	.24	.22	.24	.22	.36
Urea, pure, 112 lb cases..lb.	.14½	.15½	.14½	.15½	.14½	.15½
Fert grade, bgs, c.i.f...ton						
c.i.f. S.A. points ....ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom. f.o.b., wks ......ton	95.00	101.00	95.00	101.00	95.00	101.00
Urea Ammonia liq 55% NH_3, tks ....unit	...	nom.	...	nom.	1.00	1.04
Valonia beard, 42%, tannin bgs ....ton	...	45.00	...	45.00	45.00	52.00
Cups, 32% tannin, bgs..ton	...	30.00	...	30.00	30.00	37.50
Extract, powd, 63% ...lb.	...	.06	...	.06	...	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots ....lb.	...	2.20	...	2.20	2.10	3.10
Ex-guaiacol ....lb.	...	2.10	...	2.10	2.00	3.00
Ex-lignin ....lb.	...	2.10	...	2.10	2.00	2.25
Vermilion, English, kgs..lb.	1.50	1.64	1.50	1.64	1.45	1.69
Wattle Bark, bgs ....ton	36.50	38.50	36.00	38.50	36.00	41.75
Extract, 60°, tks, bbls..lb.	...	.04⅜	...	.04⅜	.04⅜	.04⅝
Wax, Bayberry, bgs .....lb.	.18½	.19	.16⅞	.19	.16⅞	.17
Bees, bleached, white 500 lb slabs, cases ......lb.	.37	.39	.37	.39	.35	.45
Yellow, African, bgs..lb.	.19	.20	.19	.20	.19	.26
Brazilian, bgs .....lb.	.22	.23	.22	.23	.22	.29
Chilean, bgs ......lb.	.22	.23	.22	.23	.22	.29
Refined, 500 lb slabs, cases lb.	.32½	.33	.32½	.33	.32	.39
Candelilla, bgs ....lb.	.15½	.16½	.15¼	.16½	.13½	.16
Carnauba, No. 1, yellow, bgs ....lb.	.37½	.40	.37½	.40	.38	.44
No. 2, yellow, bgs ...lb.	.36½	.38	.36½	.38	.36	.42
No. 2, N. C., bgs ....lb.	.34	.35	.34	.35	.34	.40
No. 3, Chalky, bgs...lb.	.29	.31	.29	.31	.29	.35½
No. 3, N. C., bgs ...lb.	.30	.31½	.30	.31½	.30	.35½
Ceresin, dom, bgs .....lb.	.08½	.11½	.08½	.11½	.08½	.11½
Japan, 224 lb cases ....lb.	.10¼	.10½	.09¾	.10½	.09¼	.11
Montan, crude, bgs ....lb.	.11	.11¾	.11	.11¾	.11	.12⅛
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.18	.21	.18	.21	.22	.24
Cakes, cases ....lb.	.19	.22	.19	.22	.23	.25
Whiting, chalk, com 200 lb bgs c-l, wks ....ton	12.00	14.00	12.00	14.00	12.00	14.00
Gilders, bgs, c-l, wks..ton	...	15.00	...	15.00	...	15.00
Wood Flour, c-l, bgs ...ton	20.00	30.00	20.00	30.00	20.00	33.00
Xylol, frt all'd, East 10° tks, wks ....gal.	...	.29	...	.29	.29	.33
Coml, tks, wks, frt all'd, gal.	...	.26	...	.26	.26	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36
Zinc Acetate, tech, bbls, lcl, delv ....lb.	...	.21	...	.21	...	.21
Arsenate, bgs, frt all'd..lb.	.12½	.13	.12½	.13	.12½	.13½
Arsenite, bgs, frt all'd..lb.	.12½	.13	.12½	.13	.12½	.13
Carbonate tech, bbls, NY lb.	.14	.15	.14	.15	.14	.15
Chloride fused, 600 lb drs, wks ....lb.	.04¼	.046	.04¼	.046	.04¼	.046
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	...	2.25

* Jan. 30.

Current

Zinc Cyanide
Oil, Whale

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Zinc (continued):						
Cyanide, 100 lb drs. . . . lb.	. . .	.33	. . .	.33	.33	.38
Dust, 500 lb bbls, c-l, delv lb.	. . .	.06½	.06½	.06¾	.06 .	.0740
Metal, high grade slabs, c-l,						
NY . . . . 100 lb.	. . .	4.90	4.84	4.90	4.35	5.45
E. St. Louis . . . . . 100 lb.	.	4.50	. . .	4.50	4.00	5.05
Oxide, Amer, bgs, wks lb.	.06¼	.07½	.06¼	.07½	.06	.07½
French 300 lb bbls, wks lb.	.06½	.07¾	.06½	.07¾	.06¼	.07¾
Palmitate, bbls . . . . lb.	.23	.25	.23	.25	.23	.25
Resinate, fused, pale bbls lb.	. . .	.10	. . .	.10	.	.10
Stearate, 50 lb bbls . . . lb.	.20	.23	.20	.23	.20	.23
Zinc Sulfate, crys, 400 lb bbl,						
wks . . . . lb.	. . .	.029	. . .	.029	.029	.033
Flake, bbls . . . . lb.	.	.0325	. .	.0325	.0325	.0375
Sulfide, 500 lb bbls, delv lb.	.08⅛	.08⅜	.08⅛	.08⅞	.08⅝	.09¾
bgs, delv . . . . lb.	.07⅞	.08⅛	.07⅞	.08⅝	.08⅜	.09
Sulfocarboiate, 100 lb kgs lb.	.24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75%						
grd, bbls, wks . . . . . ton	75.00	100.00	75.00	100.00	75.00	100.00
kgs, wks . . . . lb.	.04¼	.04½	.04¼	.04½	.04¼	.04½

Oils and Fats

	Current Market		1939 Low	1939 High	1938 Low	1938 High
Babassu, tks, futures . . . lb.	.	.06½	. . .	.06½	.06⅛	.06¾
Castor, No. 3, 400 lb bbls lb.	.09¼	.10	.09¼	.10	.09¼	.10¾
Blown, 400 lb bbls lb.	.11¼	.12	.11¼	.12	.11¼	.13
China Wood, drs, spot NY lb.	15.	.15¼	.15	.15½	.10¼	.15½
Tks, spot NY . . . . . . lb.	.14½	.14¾	.14½	.14¾	.095	.15½
Coconut, edible, bbls NY lb.	. . .	.08⅛	. . .	.08⅛	.08⅛	.09½
Manila, tks, NY . . . . . lb.		.03⅛	. .	.03⅛	.03⅛	.04¼
Tks, Pacific Coast . . lb.	.02⅝	.02¾	.02⅝	.02¾	.02⅝	.03¾
Cod, Newfoundland, 50 gal						
bbls . . . . gal.	.29	nom.	.29	.35	.35	.52
Copra, bgs, NY . . . . lb.		.0170	. . .	.0170	.0170	.0235
Corn, crude, tks, mills . . lb.	.06⅛	.06¼	.06⅛	.06¼	.06⅜	.08¼
Refd, 375 lb bbls, NY lb.	.09	.09¼	.09	.09¾	.09¼	.10½
Degras, American, 50 gal bbls						
NY . . . . lb.	.07	.08	.07	.08	.07½	.08¼
English, bbls, NY . . . . . lb.	.07	.08	.07	.08	.07½	.08¼
Greases, Yellow . . . . . . lb.	.04⅞	.05⅛	.04⅞	.05⅛	.03½	.05½
White, choice bbls, NY lb.	05¾	.06	.05½	.06	.05	.07
Lard, Oil, edible, prime lb.	. . .	.10	.10	.10¼	.10¼	.12¾
Extra, bbls . . . . lb	. . .	.09⅜	.09	.09⅜	.08¾	.10¾
Extra, No. 1, bbls . . . lb.	. .	.09¼	.09	.09¼	.08⅝	.09¾
Linseed, Raw less than 5 bbl						
lots . . . . lb.	.093	.095	.093	.095	.089	.115
bbls, c-l, spot . . . . lb.	.085	.087	.085	.087	.081	.102
Tks . . . . lb.	.079	.081	.079	.081	.07½	.096
Menhaden, tks, Baltimore gal	.32	nom.	.30	.32	.34½	.37½
Refined, alkali, drs . . . lb.	. . .	.076	.076	.077	.067	.095
Tks . . . . lb	. . .	.07	.07	.071	.061	.087
Kettle bodied, drs . . . . lb.	. . .	.086	.086	.088	.076	.105
Light pressed, drs . . . . . lb.	. . .	.07	.07	.071	.061	.091
Tks . . . . lb.	. .	.064	.064	.065	.05½	.08
Neatsfoot, CT, 20°, bbls, NY lb.	. . .	.15¼	. . .	.15¼	.15¼	.17¼
Extra, bbls, NY . . . . lb.	. .	.09¼	.09	.09¼	.08⅝	.10
Pure, bbls, NY . . . . lb.		.11¾	.10¾	.11¾	.10¾	.12¼
Oiticica, bbls . . . . lb.	.10½	.11	.10½	.11	.09¼	.12¾
Oleo, No. 1, bbls, NY . . . lb.	. . .	.08	.08	.08¾	.08½	.10½
No. 2, bbls, NY . . . . . lb.		.07¼	.07¼	.08	.08	.10
Olive, denat, bbls, NY . . gal	.92	.93	.92	.93	.86	1.20
Edible, bbls, NY . . . . gal.	1.75	2.00	1.75	2.00	1.75	2.35
Foots, bbls, NY . . . . . . lb.	.07⅛	.07¼	.07⅛	.07¼	.07	.09⅞
Palm, Kernel, bulk . . . . . lb.		.0340	. . .	.0340	.0325	.04½
Niger, cks . . . . lb	.03⅝	.03¾	.03⅝	.03¾	. . .	. . .
Sumatra, tks . . . . lb	. . .	.02¾	. . .	.02¾	.02⅝	.0375
Peanut, crude, bbls, NY lb.	. .	.06¼	.06¼	.07	.07	.08¼
Tks, f.o.b. mill . . . . lb		.06⅛	.06⅛	.06⅝	.06⅝	.08
Refined, bbls, NY . . . . . . lb	.09½	.09¾	.09½	.10	.09¾	.10¾
Perilla, drs, NY . . . . lb	.09⅝	.09¾	.09⅝	.09¾	.09¾	.11¾
Tks, Coast . . . . lb	.09	.092	.09	.0925	.09	.11
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.14	.14½	.14	.14½	.14	.14¾
Denatured, drs, NY . . gal	.80	.82	.80	.82	.75	.91
Red, Distilled, bbls . . . . . . lb.	.07⅜	.08⅛	.07⅜	.08⅛	.07⅜	.10⅝
Tks . . . . lb.	.06½	.07½	.06½	.07½	.06½	.09¾
Sardine, Pac Coast, tks gal	. . .	.28½	.28½	.31½	.28	.46½
Refined alkali, drs . . . . lb.	. . .	.076	.076	.077	.067	.095
Tks . . . . lb	. . .	.07	.07	.071	.061	.087
Light pressed, drs . . . . lb.	. . .	.07	.07	.071	.061	.089
Tks . . . . lb.	. . .	.064	.064	.065	.05½	.08
Sesame, yellow, dom . . . . lb.	. . .	.10½	. . .	.10½	.10¼	.10½
White, dom . . . . lb	. . .	.10½	. . .	.10½	.10¼	.10½
Soy Bean, crude						
Dom, tks, f.o.b. mills lb	. .	.055	.055	.05¾	.05⅞	.07
Crude, drs, NY . . . . . . lb	.061	.065	.061	.065	.06½	.08
Ref'd, drs, NY . . . . lb.	.073	.077	.073	.077	.07⅝	.097
Tks . . . . lb.	. . .	.067	.067	.0675	.0685	.082
Sperm, 38° CT, bleached bbls						
NY . . . . lb.	.09	.092	.09	.10	.10	.102
45° CT, bleached, bbls,						
NY . . . . lb.	.083	.085	.083	.093	.093	.095
Stearic Acid, double pressed						
dist bgs . . . . lb.	.10½	.11½	.10½	.11½	.10	.12
Double pressed saponified						
bgs . . . . lb.	.10¾	.11¾	.10¼	.11¾	.10¼	.12¼
Triple pressed dist bgs lb.	.13½	.14½	.13	.14½	.13	.15
Stearine, Oleo, bbls . . . . lb.	.06¼	.06¾	.06¼	.06¾	.05½	.08½
Tallow City, extra loose lb.	.	.05⅜	. . .	.05⅜	.04¾	.06⅜
Edible, tierces . . . . lb	.06	nom.	.06	.06	.06	.07⅝
Acidless, tks, NY . . . . . lb		.08¼	.08	.08¼	.07¾	.09¼
Turkey Red, single, drs . . . lb.	.06⅛	.08⅝	.06⅛	.08⅝	.06¼	.08½
Double, bbls . . . . lb	.09⅜	.10⅞	.09⅜	.10⅞	.09½	.13
Whale:						
Winter bleach, bbls, NY lb.	.081	.083	.081	.083	.081	.10
Refined, nat, bbls, NY lb	.077	.079	.077	.079	.077	.096

YELKIN "T"
THE STANDARDIZED LECITHIN
EXHIBITS MARKED SURFACE EFFECTS IN DILUTE OIL SOLUTIONS
LOWERING SURFACE TENSION AND GREATLY REDUCING INTER-FACIAL TENSION BETWEEN OIL AND WATER INTERFACES AND OIL SOLIDS INTERFACES

Yelkin "T" is available in standardized grades for technical use on a commercial basis. Samples furnished for experimental use if requested on your business stationery.

THREE GRADES
Grade "T"—Dark Brown
Grade "S"—Light Brown
Grade "D"—Golden

Sole Distributors
ROSS & ROWE, INC.
75 VARICK STREET NEW YORK
WRIGLEY BLDG. CHICAGO

BEACON
Refined
Naphthenic Acid
270 Acidity
THE BEACON COMPANY
89 Bickford Street Boston, Mass.
Send for our booklet "Protective Colloids and Emulsions"

Glycocoll
(AMINO ACETIC ACID)
USES: Medicinal in Tonics - Buffer - Mfr. of Dyes - Synthetic - Antioxidant - Dyeing Assistant - Preservative - Addition Agent.
CAPRYL ALCOHOL
ACETAMIDE
CHLOR-PARAFFINS
AMECCO CHEMICALS, INC.
(Formerly American Chemical Products Co.)
75 Rockwood St. Rochester, N. Y.
AMECCO CHEMICALS

Church & Dwight, Inc.

Established 1846

70 PINE STREET NEW YORK

Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

Standard Quality

E. DeHaën's

FIXANAL

VOLUMETRIC SOLUTION

For Convenient and Rapid Testing

FIXANAL Preparations are accurately weighed, standardized, analytical chemicals, which, diluted according to directions, provide accurate volumetric solutions for instant use. Guaranteed accuracy within 2 parts per 1000. Special Normalities for testing Sugar, Oil and Fat, Blood and Urine, Milk, Iron and Steel, Benzol, etc.

J.D.Riedel-E.deHaën A.G. Hannover

Write for details

Pfaltz & Bauer, Inc.

EMPIRE STATE BUILDING, NEW YORK

BOLTED RING

STEEL DRUM

EASTERN

Full Removable Head

CONTAINERS

Where added strength and security are needed use our "Bolted Ring Seal" drum shown above. Supplied in sizes from 10 to 70 gallons. Suitable for solids and semi-liquids. Consult us freely on your packaging problems.

We manufacture a complete line of light gauge containers.

EASTERN STEEL BARREL CORP.

BOUND BROOK - - - NEW JERSEY

Index to Advertisers

ADVERTISING PAGES REMOVED

"We"—Editorially Speaking

Dr. Benjamin T. Brooks, contributor to the Creating Industries Series of the arti-

cle in this issue on "Hydrocarbon Fuels and Lubricants," needs no introduction to our readers, for his work as a consultant and his research on petroleum and its related products are widely known. He was born in Columbus, Ohio, in 1885, and received his Ph.D. from Göttingen in 1912. From 1912 to 1917 he had charge as senior fellow at Mellon Institute of petroleum research for Gulf Refining Co. From this followed the development of synthetic products from oil gas. Many patents have been issued to him for processes dealing with petroleum cracking, gasoline refining, organic synthetic products made from petroleum, including amyl acetate, ethylene glycol, ethylene chlorohydrin, ethylene oxide, synthetic alcohols, etc. Besides the numerous articles he has contributed to the literature, he is the author of *The Chemistry of the Non-Benzenoid Hydrocarbons*, published in 1922, and was American editor of *The Science of Petroleum* in 1937. He served as Chairman, Committee on Petroleum Research, National Research Council from 1924 to 1925, and with Dr. Van H. Manning investigated and planned a method for the support of petroleum research, adopted and administered by the American Petroleum Institute in 1925.

Fifteen Years Ago

From our issues of February, 1924.

Stroock and Wittenberg formed, to handle varnish, gums, Chinawood oil, and other products for the paint and varnish industries.

A. V. H. Mory appointed director publicity for Bakelite Corp.

Arthur C. Trask withdraws from Falk Co., Pittsburgh, and forms own company, A. C. Trask Co., with offices in Chicago.

C. A. Mace, formerly Butterworth-Judson and Tower Mfg. Co., appointed sales manager of F. E. Atteaux & Co., Boston.

Arthur S. Somers, general manager, Fred L. Lavanburg Co., elected president, Drug and Chemical Club.

E. R. Bridgewater joins Dyestuffs Division sales staff of du Pont.

Increase of 19 per cent. in 1923 chemical exports reported by Chemical Division, Department of Commerce.

Seized German dye, drug and chemical patents yielded U. S. government $1,000,153 in royalties.

Robt. W. White, formerly assistant general sales manager, Linde Air Products, becomes sales manager, Carbide & Carbon Chemicals Corp.

"We" had all but abandoned hope of ever receiving Charles S. Wehrly's manuscript on mercury when lo! it came to hand; and after reading this issue you, too, will know what an extraordinary amount of documentary research went into this review of quicksilver. It's one of the outstanding articles in the Raw Materials Series.

Mr. Wehrly was born in New Jersey and educated at Rutgers and Columbia. He was with Alex H. Pickering in London in 1919-1925; served as a chemical adviser on the Reparations Commission; returned to the U. S. with Henry W. Peabody & Co.; left Peabody in '32 to join Merchants Chemical. In the trade he is accepted as an authority on at least three subjects: mercury, bridge, and roses.

Did you know:—

That there are ONLY one hundred ninety-four thousand, six hundred and thirty-two separate taxing units in the U. S.?

That N. Y. State has now thirty-two different kinds of taxes and in Governor Lehman's recent budget message he suggests adding two more?

"We" to You—

By merging with the publications of the Tradepress group of New York and Chicago, CHEMICAL INDUSTRIES has acquired a greater ability to serve you. In such a union with "Rock Products," "Inland Printer," "Box and Barrel," and the other industrial and trade magazines of this large and experienced organization there is great strength.

"We" carry-on. Williams Haynes as editorial director, William F. George in charge of advertising, Walter J. Murphy as managing editor, Miss Adele Corbet, associate editor, and J. H. Burt, production manager. The staff continues its regular work with added resources and renewed enthusiasm.

"We" have a new address in New York—522 Fifth Avenue—and a new office in Chicago at 205 W. Wacker Drive. Our telephone is now Vanderbilt 3-7333.

Call us if we can serve you.

"We" don't know, of course, the printing order for the current issue of the *Monsanto Magazine*, but if you haven't seen a copy, by all means beg, borrow, or steal one, for it is in words, photographs and pictographs the record of the people who own Monsanto and make possible a typical American company. "We" liked best the smiling countenance of "Spuds" Crosset, a Cincinnati potato dealer and Monsanto owner on the front cover. Our congratulations to the company and to Editor Howard A. Marple.

Does anyone seem to remember that "impish" is a characteristic usually associated either with Thomas Jefferson or Andrew Jackson?

The tax curve is the only item in American Business statistics that has risen steadily since 1932, which we are all told was the low point of the depression.

No man is as clever as his wife thought he was when he proposed, nor as dumb as she thinks he is now; and maybe business is much the same: not as good as we thought, and not so bad as we think.

State of Chemical Trade

Current Statistics (Jan. 31, 1939)—p. 27

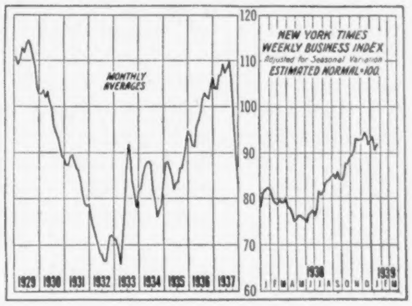
WEEKLY STATISTICS OF BUSINESS

Week Ending	Carloadings 1938	Carloadings 1937	Carloadings % of Change	Electrical Output* 1938	Electrical Output* 1937	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Dec. 31	499,895	454,906	+ 9.0	2,120,555	1,998,135	+ 6.1	75.4	92.7	54.2	71.5	78.0	73.4	76.3	50.7	92.4	124.5
	1939	1938		1938	1937											
Jan. 7	530,849	552,568	— 4.0	2,139,582	2,139,582	+ 1.4	75.0	92.7	54.1	71.8	78.0	73.3	76.3	51.7	93.5	124.9
Jan. 14	586,877	580,740	+ 1.0	2,269,846	2,115,134	+ 7.3	74.9	92.7	52.6	71.8	78.0	72.8	76.4	52.7	90.7	125.4
Jan. 21	590,359	570,233	+ 3.5	2,289,659	2,108,968	+ 8.6	75.3	92.6	52.3	71.6	78.2	72.9	76.3	51.2	91.6	125.3
Jan. 28	594,379	553,176	+ 6.9	2,292,594	2,098,968	+ 9.2	75.0	92.4	52.6	71.7	78.2	72.8	76.1	52.8	92.3	125.4

MONTHLY STATISTICS

CHEMICAL:	December 1938	December 1937	November 1938	November 1937	October 1938	October 1937
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	......	199,508	171,106	205,796	161,285	212,258
Consumpt. in mfr. fert.	......	147,443	147,592	166,778	151,083	166,031
Stocks end of month	......	89,662	87,331	91,498	90,340	76,403
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	16,772,479	17,361,670	15,163,681	18,179,322	17,016,879	18,786,249
Comp. denat. prod., wine gal.	2,111,297	1,826,805	2,827,108	4,127,663	3,723,506	7,849,380
Removed, wine gal.	2,115,316	1,841,075	2,989,361	4,266,405	3,985,430	8,272,344
Stocks end of mo., wine gal.	426,638	546,648	433,238	564,671	597,196	709,422
Spec. denat. prod., wine gal.	8,388,939	5,185,331	7,367,630	5,480,908	7,376,997	6,514,411
Removed, wine gal.	8,317,195	5,129,560	7,319,801	5,685,569	7,202,966	6,522,984
Stocks end of mo., wine gal.	858,630	606,224	799,477	555,036	767,078	765,030
Ammonia sulfate prod., tons *a*	45,837	43,211	44,985	50,234	43,005	62,806
Benzol prod., gal. *b*	7,802,000	6,340,000	7,619,000	7,472,000	7,100,000	9,610,000
Byproduct coke, prod., tons *a*	3,362,845	2,823,800	3,277,523	3,222,300	3,092,806	4,035,100
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	543,797	412,887	773,450	824,170	767,599	1,018,760
Sheets, ship., lbs.	674,069	514,027	675,716	736,726	804,556	1,109,000
Rods, prod., lbs.	187,926	148,889	174,270	185,891	203,996	174,950
Rods, ship., lbs.	201,074	139,682	266,944	158,721	252,909	258,351
Tubes, prod., lbs.	57,695	40,701	70,001	56,957	79,496	89,760
Tubes, ship., lbs.	61,942	46,257	65,573	82,920	66,470	102,257
Cellulose acetate, sheets, rods, tubes						
Production, lbs.	1,111,639	624,078	1,331,717	782,929	944,551	919,432
Shipments, lbs.	1,031,652	602,887	1,250,528	678,319	1,048,487	962 702
Methanol (Bureau of the Census)						
Production, crude, gals.	357,249	461,539	344,328	423,315	335,380	423,792
Production, synthetic, gals.	2,844,249	3,887,741	2,617,979	3,562,372	2,294,532	3,532,091
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	2,710,218	1,890,806	2,524,659	2,257,102	2,539,528	2,788,158
Heavy goods, ship., linear yds.	1,763,791	1,280,338	1,608,956	1,351,823	1,943,776	1,828,913
Pyroxylin spreads, lbs. *c*	4,647,020	3,365,894	4,263,377	3,762,146	4,902,740	4,944,517
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	......	$10,785	$10,639	$11,521	$13,254	$12,893
Crude sulfur *d*	$620	$1,348	$600	$865	$1,326	$1,831
Coal-tar chemicals *d*	$1,032	$1,114	$815	$991	$890	$1,073
Industrial chemicals *d*	$2,065	$1,933	$2,093	$2,226	$2,511	$2,568
Imports						
Chemicals and related prod. *d*	......	$8,261	$6,930	$7,804	$8,048	$8,506
Coal-tar chemicals *d*	$1,188	$1,482	$1,917	$1,229	$1,393	$1,948
Industrial chemicals *d*	$1,295	$1,551	$1,295	$2,033	$1,750	$1,745
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	120.1	122.4	119.1	129.9	120.1	135.1
Other than petroleum	115.9	117.2	114.6	126.3	116.2	132.5
Chemicals	130.2	131.4	128.1	142.8	128.3	151.8
Explosives	95.1	97.6	91.7	103.8	96.5	107.7
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100)						
Chemicals and allied prod., including petroleum	112.6	118.3	113.0	124.5	113.4	128.5
Other than petroleum	111.3	117.0	111.6	123.7	111.9	128.3
Chemicals	116.9	124.8	117.2	132.1	115.0	137.7
Explosives	82.7	89.3	82.8	90.1	84.1	91.8
Price index chemicals	80.0	83.5	80.2	84.2	80.5	85.3
Chem. and drugs	76.7	79.5	76.6	80.2	77.1	81.2
Fert. mat.	68.6	72.0	67.7	71.9	67.5	72.5
FERTILIZER:						
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	......	147,587	152,388	134,929	178,734
Ammonium sulfate	......	......	4,494	13,485	5,613	9,328
Total phosphate rock	......	......	107,760	85,597	67,078	121,567
Total potash fertilizers	......	......	3,080	13,730	18,061	2,925
Imports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	......	114,164	150,657	156,034	152,919
Ammonium sulfate	......	......	9,677	11.910	5,605	2,746
Sodium nitrate	......	......	4,851	21,398	32,971	2,871
Total potash fertilizer	......	......	58,730	69,842	64,124	93,961

INDUSTRIAL TRENDS



Business: Steady gains in business activity were reported from week to week during the past month, but the rate of expansion was just a little disappointing to those who expected a sharp rebound from the year-end letdown. A break in the securities markets late in January had a disconcerting effect.

Steel: Although the gain in activity did not reach the proportions of earlier estimates, there was a slow, steady improvement. January tonnage was about 20% ahead of December's figure. The '38 pig iron total was 18,773,135 tons, a loss of 48.7% from the '37 volume. The '38 steel output was the lowest in 4 years. The total of 27,839,261 gross tons compares unfavorably with the 49,502,907 tons for '37, the decline being 44%. At the moment railroad buying is bringing out the largest tonnages. The automotive producers are expected to increase their commitments very shortly.

Automotive: January production of about 300,000 units was just about up to earlier expectations. While some decline from this total might be looked for in February, the strong possibility is that about the same number will come off the assembly lines.

Retail Trade: Current reports indicate that dollar sales are still behind last year's totals in farm areas and along the Atlantic seaboard. In most of the agricultural sections the decline is only about 3 or 4%. Retailers look for more favorable trade comparisons in the weeks ahead.

Wholesale Trade: The current volume is somewhat ahead of the corresponding period of a year ago, but is not expanding to any appreciable de-

State of Chemical Trade
Current Statistics (Jan. 31, 1939)—p. 27

State of Chemical Trade

Current Statistics (Jan. 31, 1939)—p. 28

gree. Momentarily there is no speculative buying.

Employment: The Dept. of Commerce reports an increase of 200,000 in employment in non-agricultural industries in December. About 1,200,000 have been re-hired since July.

Textiles: Outlook continues favorable. U. S. rayon consumption in '38 established a new record with a total of 327,387,000 lbs. This compares with 323,623,000 lbs. consumed in the previous record year of '36. Much of the increase was due to the widespread popularity of spun rayon fabrics. Cotton spindle activity dropped slightly in December from the November figure. Operations in December were at 82.3% of capacity, compared with 83.6% during November and 58.3% during December, 1937.

Glass: Plate glass output in '38 was but 44% of the '37 total. December production was 12,691,262 sq. ft., compared with 12,883,448 in November and 8,920,809 in December of '37. Production of window glass in December showed a gain. In the final month of '38 output was 1,003,150 boxes, representing 61.7% of the industry capacity, as compared with 953,964 boxes and 58.7% of capacity in the corresponding month of '37.

Rubber: December crude rubber consumption was 55% above the total for the same month a year previous. December tire shipments gained 37% over the same month of '37. Total sales for year were 42,395,176 units, compared with 53,485,388 in '37. Private estimates indicate 50,000,000 for '39.

Commodity Prices: All indices showed slight losses in January.

Paper: Newsprint production declined 24.9% in '38. Shipments in December were greater than production. Outlook is for larger volume.

Chemicals: The usual January pickup in shipments was reported, but the gain was not up to earlier expectations.

Coatings: A slow start was made in the first two weeks of January, but the rate of activity is expected to jump ahead fast over the next month.

Fertilizers: Outlook is somewhat better than at this time a year ago.

Outlook: Some revision of earlier trade predictions became inevitable following a slump in the security markets, the development of a new war scare in Europe, and the failure of industrial activity to advance more definitely. However, the belief remains general that '39 will witness further improvement, possibly to the extent of 10 to 15%.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	December 1938	December 1937	November 1938	November 1937	October 1938	October 1937
Superphosphate e (Nat. Fert. Association)						
Production, bulk	280,293	357,479	287,123	324,514	259,305	333.553
Shipments, total	163,992	190,089	133,803	179,112	213,161	227,368
Northern area	65,432	88,274	66.239	96,182	122,569	132,543
Southern area	98,560	101,815	67,564	82,930	90,592	94,825
Stocks, end of month, total	1,768,103	1,845,001	1,595,469	1,607,475	1,388,395	1,416,941
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	219,046	186,941	146,872	123,466	131,199	146,913
Total, 12 southern	217,180	184,948	146,145	122,889	121,480	126,587
Total, 5 midwest	1,866	1,993	727	577	9,719	20,326
Fertilizer payrolls	7,018	81.2	65.2	76.5	70.1	82.2
Fertilizer employment	82.6	90.6	78.5	83.6	79.5	89.4
Value imports, fert. and mat. *d*	......	$4,318	$2,805	$3,633	$3,994	$3,689
GENERAL:						
Acceptances outst'd'g *f*	$269	$343	$273	$348	$269	$346
Coal prod., anthracite, tons	.....	4,752,000	3,167,348	3,694,322	3,518,678	4,320,074
Coal prod., bituminous, tons	.....	36,226,000	35,480,000	36,428,000	34,900,000	40,833,000
Com. paper outst'd'g *f*	$186	$279	$206	$311	$213	$323
Failures, Dun & Bradstreet	875	1,009	984	842	997	815
Factory payrolls *i*	86.6	84.2	84.1	84.1	83.9	104.5
Factory employment *i*	91.1	94.5	90.5	101.1	89.5	107.2
Merchandise imports *i*	$171,474	$208,833	$176,181	$223,090	$177,979	$224,299
Merchandise exports *i*	$268,756	$323,403	$252,231	$314,697	$277,928	$332,910
GENERAL MANUFACTURING:						
Automotive production	388,346	326,234	372,359	360,055	209,522	329,876
Boot and shoe prod., pairs	......	21,047,582	29.742,503	21,289,938	34,616,562	29,691,637
Bldg. contracts, Dodge *j*	$389,439	$209,451	$301,679	$198,464	$357,698	$202,081
Newsprint prod., U. S. tons	75,855	79,537	78,390	79,338	72,827	78,352
Newsprint prod., Canada, tons.	209,753	293,038	245,295	302,236	254,872	314,594
Glass Containers, gross	3,514,537	....	3,709,379	3,491,251	....	....
Plate glass prod., sq. ft.	12,691,262	8,920,809	12,883,448	12,517,311	12,868,717	14,854,918
Window glass prod., boxes	1,003,150	953,964	882,595	1,095,267	641,394	......
Steel ingot prod., tons	3,143,169	1,473,021	3,572,220	2,154,365	3,117,934	3,392,924
% steel capacity	53.0	25.37	62.5	38.23	52.45	58.31
Pig iron prod., tons	2,201,627	1,490,324	2,269,983	2,006,724	2,052,284	2,892,629
U. S. consumpt. crude rub., tons	45,315	29,195	46,169	34,025	40,333	38,754
Tire shipments	4,170,808	3,043,970	4,442,296	3,776,775	4,143,616	3,950,920
Tire production	4,678,878	2,851,940	4,117,457	3,119,585	4,134,319	3,985,019
Tire inventories	8,497,932	10,383,235	7,924,114	10,963,469	8,237,338	11,643,709
Cotton consumpt., bales	565,307	432,328	596,289	482,976	542,778	524,188
Cotton spindles oper.	22,444,784	22,337,254	22,449,280	22,778,818	22,113,952	23,714,646
Silk deliveries, bales	35,204	21,982	41.599	31,749	35,631	36,002
Wool Consumption *z*	......	15.0	34.1	14.0	28.3	17.7
Rayon deliv., lbs.	......	......	21,000,000	9,400,000	24,500,000	14,100,000
Hosiery (all kinds) *t*	......	......	9,035,186	7,069,349	8,806,580	7,562,386
Rayon employment *i*	311.2	314.5	312.8	349.2	314.4	361.8
Rayon payrolls *i*	302.2	294.0	302.7	337.9	302.6	351.6
Soap employment *i*	88.6	87.6	88.9	92.6	93.2	94.6
Soap payrolls *i*	89.5	89.1	88.3	93.4	94.8	96.6
Paper and pulp employment *i*.	106.2	106.8	105.9	110.9	104.8	104.0
Paper and pulp payrolls *i*	103.8	97.3	103.0	103.8	106.5	115.0
Leather employment	85.3	76.9	84.0	81.1	81.2	87.6
Leather payrolls *i*	87.8	71.4	84.7	75.2	81.7	86.3
Glass employment *i*	92.6	99.8	92.1	106.5	87.5	109.7
Glass payrolls *i*	98.9	96.5	98.6	112.7	92.9	120.1
Rubber prod. employment *i*	83.5	85.6	82.4	90.5	77.7	97.1
Rubber prod. payrolls *i*	89.1	77.3	85.2	82.2	79.7	94.5
Dyeing and fin. employment *i*.	112.4	105.5	109.3	108.9	105.9	112.3
Dyeing and fin. payrolls *i*	97.3	86.6	92.7	89.1	92.0	94.6
MISCELLANEOUS:						
Oils & Fats Index ('26 = 100)	57.5	85.6	57.9	67.1	58.6	70.1
Gasoline prod., bbls.	......	47,629	48,201	47.877	49,789	50,744
Cottonseed oil consumpt., bbls.	......	358,328	263,024	427,605	281,028	487,837
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	......	$19,348,567	$26.253.314	$26,105,315	$30,007,078	$32,791,845
Trade sales (580 establishments)	......	$9,088,658	$13,183,545	$12,790,654	$16,128,067	$16,256,222
Industrial sales, total	......	$8,293,742	$10,638,281	$10,889,719	$10,985,822	$13,447,493
Paint & Varnish, employ. *i*	112.4	117.2	112.4	123.8	112.9	....
Paint & Varnish, payrolls *i*	115.4	113.5	113.8	122.1	116.3	....
Paint & Varnish, exports *d*	$790	$862	......	......	....	....

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100; *j* 000 omitted, 37 states; *p* Rayon Organon, formerly an index was given, now the exact poundage is given; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *t* 381 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.

Financial Reports

Report of Chemical Fund, Inc., for quarter ended Dec. 31, 1938, states that net assets, taking securities at market value as of Dec. 31, last, amounted to $1,962,459, equal to $10.65 a share on the 184,181 shares of capital stock outstanding at close of the period. This compares with net assets of $969,610 equal to $9.80 a share on 98,897 shares outstanding on Sept. 30, 1938.

Freeport Sulphur, '38

Freeport Sulphur had a consolidated net income in 1938 of $1,506,059 after Federal taxes and all charges, according to the preliminary statement submitted to directors on Jan. 25, by Langbourne M. Williams, Jr., president. Earnings are equivalent to $1.87 each on 796,380 common shares outstanding and are compared with $2,703,742, or $3.30 a share earned in 1937.

Company's subsidiary, Cuban-American Manganese, which contributed $261,052, or 33c a share, of the consolidated earnings in 1937, had a net loss in 1938 of which Freeport's proportionate share was $6,570.

Although the manganese subsidiary had a profit of 12c a share on Freeport's stock in the first 9 months of last year, Mr. Williams explained, an inventory write-down necessitated by a sharp decrease in the world market price for manganese was responsible for the small loss sustained in the full year.

Dow Nets $1,428,372

Dow Chemical and subsidiaries report for six months ended Nov. 30, 1938, net profit of $1,428,372 after interest, depreciation, federal income taxes, etc., equal after dividend requirements on 5% preferred stock, to $1.35 a share on 945,000 shares of common stock.

This compares with $2,381,137 or $2.44 a share on common for six months ended Nov. 30, 1937.

For quarter ended Nov. 30, 1938, indicated net profit, based on a comparison of company's reports for first quarter and the six months period, was $589,669 equal to 54 cents a share on common stock, comparing with net profit of $838,703 or 81 cents a common share in quarter ended Aug. 31, 1938.

Commercial Solvents, Ltd.

It is understood that Commercial Solvents Corp. has sold the balance of its interest in Commercial Solvents (Great Britain), Ltd., consisting of 28,500 common, £1 shares to United Molasses Co., Ltd.

Hercules' Yearly Report

Hercules Powder Co. and subsidiaries report for the year ended Dec. 31, 1938, net profit of $3,089,017 after depreciation, federal income taxes, etc., equal after deducting $524,928 preferred dividends, to $1.95 a share on 1,316,710 shares of common stock.

For year ended Dec. 31, 1937, net profit was $4,440,273, equal after dividends paid on preferred stock, to $3.23 a share on 1,212,240 average number of common shares outstanding during that year, and $2.97 a share on 1,316,710 common shares outstanding at close of year.

For quarter ended Dec. 31, 1938, net profit was $1,120,382, equal after preferred dividends, to 75 cents a common share, comparing with $741,501 or 46 cents a common share in quarter ended Sept. 30, 1938.

Value of chemical stocks on Feb. 1, 1939 on the N. Y. Stock Exchange totaled $5,767,948,741 with an average share value of $65.54, as compared with $6,069,058,959 and $69.04 on Jan. 1, 1939. This shows for the month a net loss of $301,110,218 in total value and $3.50 for the average share value.

Value of the chemical stocks on Jan. 1, 1938 totaled $4,740,707,834 and they had an average value of $54.48 so that in the 12 months of '38 a total of $1,328,351,125 was added to the value of the chemical group and the average value rose $14.56.

Dividends and Dates

Name	Div.	Stock Record	Payable
Amer. Smelt. & Refin. Co.	50c	Feb. 3	Feb. 28
Archer-Daniels-Midland, pf., q.	$1.75	Jan. 21	Feb. 1
Atlantic Refining Co., pf., q.	$1.00	Jan. 6	Feb. 1
Atlas Powder, pf., q.	$1.25	Jan. 20	Feb. 1
Bon Ami, Class A, q.	$1.00	Jan. 16	Jan. 31
Bon Ami, Class B, q.	62½c	Jan. 16	Jan. 31
Colgate-Palmolive Peet, q.	12½c	Jan. 24	Feb. 15
Devoe & Raynolds, A and B	passed Dec. 7, 1938		
Dow Chemical	75c	Feb. 1	Feb. 15
Dow Chemical, pf., q.	$1.25	Feb. 1	Feb. 15
Freeport Sulphur, q	25c	Feb. 14	Mar. 1
Hercules Powder, pf., q.	$1.50	Feb. 3	Feb. 15
Int'l Nickel of Can., pf., q.	$1.75	Jan. 3	Feb. 1
Monsanto Chemical, pf., s.	$2.25	May 10	June 1
National Lead, pf. B, q.	$1.50	Jan. 20	Feb. 1
N. J. Zinc Co.	50c	Feb. 18	Mar. 10
Procter & Gamble, q.	50c	Jan. 25	Feb. 15
Rustless Iron & Steel, pf., q.	62½c	Feb. 15	Mar. 1
Sherwin-Williams	50c	Jan. 31	Feb. 15
Sherwin-Williams, pf., q.	$1.25	Feb. 15	Mar. 1
Skelly Oil, pf., q.	$1.50	Jan. 5	Feb. 1
Solvay Amer. Corp., pf., q.	$1.37½	Jan. 16	Feb. 15
Sun Oil, q.	25c	Feb. 25	Mar. 15
Sun Oil, pf., q.	$1.50	Feb. 10	Mar. 1
Texas Gulf Sulphur, q.	50c	Mar. 1	Mar. 15
Westvaco Chlorine Prods., pf., q.	37½c	Jan. 16	Feb. 1
Westvaco Chlorine pr. cp., q.	25c	Feb. 10	Mar. 1
Will & Baumer Candle	10c	Feb. 1	Feb. 15
Will & Baumer Candle, pf., q.	$2.00	Mar. 15	Apr. 1

s—semi-annual

Price Trend of Representative Chemical Company Stocks

	Dec. 31	Jan. 9	Jan. 16	Jan. 23	Jan. 31	Net gain or loss last mo.	Price on Jan. 31, 1938	1939 High	1939 Low
Air Reduction	65⅞	62¾	59¾	60	57⅝	—8¼	47¾	65⅜	54¼
Allied Chemical	193	189	183	181	173½	—19½	158	193	170½
Am. Cyan'd "B"	28	27	25½	24¾	24⅛	—3⅞	24	28⅜	22⅜
Am. Agric. Chem.	23n	23¼n	22n	21n	20½n	—2½	57	24¼n	20½
Columbian Carbon	91	90	90	90¼	83⅞*	—7⅛	65	93	83⅛
Com'l Solvents	11⅛	10⅞	11⅛	11⅜	11⅝	+½	8	12⅜	10⅜
Dow Chemical	132⅞	133½	130	129	118	—14⅞	88**	135	117½
du Pont	154½	151	149¾	149	146¾	—7¾	111½	156¾	142
Hercules Powder	86	83	78⅜	79	77	—9	52½	86	71
Mathieson Alkali	35¾	34½	32	32	31½	—4¼	23¾	36	30
Monsanto Chemical	110	107½	103	101¼	101¾	—8¼	78½	111	96
Std. of N. J.	53⅛	51¼	50½	49⅝	50¼	—2⅞	47	53¼	47¼
Tex. Gulf Sulphur	32⅜	32	31⅞	31⅜	30¾	—1⅝	30¼	32⅝	29¾
Union Carbide	89⅝	88½	85½	87¼	85⅞	—3¾	71¼	90½	81⅛
U. S. Ind. Alcohol	24¼	23	21¾	21	21½	—2¾	19½	24⅞	18½

* Jan. 28, 1938

Earnings Statements Summarized

Company:	Annual dividends	Net income 1938	Net income 1937	Common share earnings 1938	Common share earnings 1937	Surplus after dividends 1938	Surplus after dividends 1937
American Agricultural Chemical:							
Six months, Dec. 31	w$.35	†$285,903	$132,647	...	$.63	......	......
Cook Paint & Varnish:							
Year, Nov. 30	.60	190,373	x456,814	$.24	1.151	......	......
Dow Chemical:							
**Nov. 30, quarter	y3.00	589,669	....	.54	...	......	......
Six months, Nov. 30	y3.00	1,428,372	2,381,137	1.35	2.44	......	......
Freeport Sulphur:							
nYear, Dec. 31	y1.75	1,506,059	2,703,742	1.87	3.30	......	......
Hercules Powder:							
Dec. 31, quarter	y1.50	1,120,382	....	.75	...	......	......
Year, Dec. 31	y1.50	3,089,017	4,440,273	1.95	2.97	......	......
Owens-Illinois Glass:							
Year, Dec. 31	y1.75	v5,382,000	9,351,627	2.02	3.51	......	......
Pennsylvania Coal & Coke:							
Dec. 31, quarter	f ...	m19,354	‡2,975	...	...	......	......
nYear, Dec. 31	f ...	m300,836	m198,442	...	...	......	......
Procter & Gamble:							
Dec. 31, quarter	2.00	5,784,750	4,340,348	.87	.65	......	......
Six months, Dec. 31	2.00	11,882,260	9,384,686	1.79	1.40	......	......
Rustless Iron & Steel:							
Dec. 31, quarter	f ...	158,463	82,212	.15	.08	......	......
nYear, Dec. 31	f ..	81,110	713,138	p2.22	.77	......	......

w: Last dividend declared, period not announced by company; † Net loss; x: Eleven months ended Nov. 30, 1937; **Indicated quarterly earnings as shown by comparison of company's reports for first quarter of fiscal year and the 6 months period; y: Amount paid or payable in 12 months to and including payable date of the most recent dividend announcement; n: Preliminary statement; f: No common dividend; ‡ Profit before federal income taxes; p: On preferred stock.

Chemical Finances
January 1939—p. 27

Chemical Finances
January 1939—p. 28

Chemical Stocks and Bonds

Price Range: January 1939 Last	January 1939 High	January 1939 Low	1938 High	1938 Low	1937 High	1937 Low	Sales (Number of shares) January 1939	Sales 1938	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per-share-$ 1938	1937	1936
NEW YORK STOCK EXCHANGE															
57	58½	55	61	46¼	55	46	2,200	35,300	Abbott Labs.	No	640,000	$1.70	....	2.51	2.21
57⅝	65⅝	54¼	67⅞	40	80¼	44½	22,100	372,500	Air Reduction	No	2,566,191	1.50	....	2.86	2.79
173½	193	170½	197	124	258½	145	7,000	187,500	Allied Chem & Dye	No	2,214,099	6.00	....	11.19	11.44
20½	24¼	20½	28½	22	33¾	17⅞	3,500	50,500	Amer. Agric. Chem	No	627,987	1.43	....	2.95	1.57
9¾	11⅛	9⅛	15	9	30¾	8¼	7,000	147,100	Amer. Com. Alcohol	No	260,930	....	....	3.23	4.55
25½	29½	25½	31½	20	46	22	1,000	31,100	Archer-Dan.-Midland	No	549,546	1.25	....	5.03	3.05
61	66¾	57	68	36	94	38	1,800	30,800	Atlas Powder Co.	No	248,145	2.25	....	4.40	4.21
122	127	122	126¼	105	133	101	310	2,320	5% conv. cum. pfd.	100	68,597	5.00	....	20.90	20.85
20	24⅜	17⅝	26⅝	9	41¼	13	44,700	839,500	Celanese Corp. Amer.	No	1,000,000	....	....	2.04	2.33
94	94	89¼	96	82	115	90	300	6,400	prior pfd.	100	164,818	7.00	....	27.07	27.25
13⅞	14¾	11⅝	17	7⅛	25¾	8½	21,110	513,600	Colgate-Palm.-Peet	No	1,999,970	.25	....	—.35	1.40
102	104	102	104¼	78	104½	95	1,300	22,100	6% pfd.	100	248,197	6.00	....	3.21	17.13
83⅛	93	83⅛	98½	53¾	125¾	65	4,000	51,700	Columbian Carbon	No	537,406	4.00	....	8.31	7.48
11⅝	12⅜	10⅜	12¼	5⅞	21¼	5	209.500	937,600	Commercial Solvents	No	2,636,878	....	....	.60	.85
63⅛	66¾	61¼	70¾	53	71¼	50½	12,800	213,100	Corn Products	25	2,530,000	3.00	....	2.52	3.86
174⅝	176¾	174⅝	177	162	171½	153	900	6,200	7% cum. pfd.	100	245,738	7.00	....	32.96	46.76
28½	32⅜	27	40⅞	25	76⅛	29½	2,870	35,260	Devoe & Rayn. A.	No	95,000	2.00	....	4.05	4.49
118	135	117½	141	87⅞	159¼	79½	6,900	89,100	Dow Chemical	No	945,000	3.00	....	4.17	4.48
146¾	156¾	142	154¾	90½	180⅛	98	36,900	826,000	DuPont de Nemours	20	11,041,437	3.25	....	7.37	7.54
117½	121	117½	120½	109½	112	107½	1,600	32,300	4½% pfd.	No	500,000	4.50	....	165.48	......
137¾	138¼	136¾	138½	130¾	135½	130	2,700	24,700	6% cum. deb.	100	1,092,948	6.00	....	81.70	84.21
174	186⅛	171	187	121½	198	144	9,200	168,300	Eastman Kodak	No	2,250,921	6.50	....	9.76	8.23
180	180	175½	173	157	164	150	100	3,560	6% cum.	100	61,657	6.00	....	362.45	306,64
24⅝	30	24⅛	32	19⅞	32¼	18	19,600	270,300	Freeport Texas	10	796,380	2.00	....	3.30	2.43
8⅞	10⅞	8⅝	12⅛	6¾	19	8½	6,000	103,800	Gen. Printing Ink	1	735,960	.50	....	1.32	1.32
21	24½	19	28½	13	51½	19⅛	15,300	241.600	Glidden Co.	No	799,701	.50	....	2.62	3.29
45	45½	45	51½	37	58⅛	43	900	8,100	4½% cum. pfd.	50	199,940	2.25	....	12.72	15.43
103	106	102½	111	76¾	117½	80⅛	1,700	16,400	Hazel Atlas	25	434,474	5.00	....	6.67	6.55
77	86	71	87	42¾	92½	50	8,900	148,300	Hercules Powder	No	1,316,710	1.50	....	2.97	3.24
135	135¼	133	135¼	126¾	135½	125	120	4,500	6% cum. pfd.	100	96,194	6.00	....	50.75	48.97
27⅛	29½	24	30⅜	14⅜	47½	15	28,700	221,900	Industrial Rayon	No	759,325	.25	....	.34	2.24
25¾	28½	23	34½	15	64¼	20	8,600	83,700	Interchem.	No	289,058	....	....	1.44	3.02
92½	93	91½	98	80	111½	92	830	5,450	6% pfd.	100	66,917	6.00	....	12.26	18.97
2½	3⅛	2¼	3⅞	2	9⅛	2	7,100	112,000	Intern. Agricul.	No	438,048	....	....	.16	—1.55
22¾	27⅝	22¾	29	15	63½	18¼	3,000	31,600	7% cum. pfd.	100	100,000	2.00	....	7.70	.23
51⅜	55¾	46	57⅝	36⅞	73⅜	37	135,100	2,725,000	Intern. Nickel	No	14,584,025	2.00	....	3.31	2.40
31½	33	29	30¼	19½	28¾	19½	1,400	18,000	Intern. Salt	No	240,000	2.00	....	2.17	1.70
20	21½	19	24	19⅛	36	19¼	800	13,900	Kellogg (Spencer)	No	500,000	1.40	....	2.81	2.62
46¼	54	43	58⅜	23¼	79	33⅝	21,700	454,100	Libbey Owens Ford	No	2,506,117	1.25	....	4.19	4.14
17¼	19	16	21½	12⅛	26⅞	14	8,600	131,400	Liquid Carbonic	No	700,000	1.25	....	2.37	1.58
31½	36	30	36⅞	19¾	41¾	22	5,300	100,000	Mathieson Alkali	No	828,171	1.50	1.01	1.81	1.76
101¾	111	96	110	67	107½	71	11,400	218,700	Monsanto Chem.	No	1,114,338	2.00	....	4.40	4.01
116	119¼	115½	117½	111	109	105	590	5,310	4½% pfds. (A & B)	No	100,000	4.50	....	49.99	......
23⅞	27½	22	31	17⅛	44	18	32,100	676,300	National Lead	10	3,098,310	.50	....	.95	1.71
168	168	165	178½	154	171	153	600	5,600	7% cum, "A" pfd.	100	243,676	7.00	....	22.86	33.83
143	143	137¾	145½	127	150	127	1,050	5,280	6% cum. "B" pfd.	100	103,277	6.00	....	43.77	74.50
14¼	17⅛	12⅞	19½	9⅞	41¾	10⅛	30,200	945,900	Newport Industries	1	519,347	....	....	2.22	.99
65¼	70	60	76¼	40	103¾	51¼	17,700	337,200	Owens-Illinois Glass	12.50	2,661,204	1.50	....	3.51	3.80
56⅜	56½	53⅝	59	39½	65½	43¼	14,500	228,000	Procter & Gamble	No	6,325,087	2.00	....	4.08	2.39
118	118	116	122¼	114	118½	114½	1,150	13,090	5% pfd.	100	169,517	5.00	....	157.05	94.14
13¾	15⅛	11¾	18⅜	10	34¾	14⅞	20,300	279,100	Shell Union Oil	No	13,070,625	5.50	....	1.44	1.35
106	106½	104½	106½	93	105⅜	91	2,300	27,200	5½% cum. pfd.	100	379,798	.70	....	60.59	57.20
24¼	29½	21	34¾	18½	60⅝	26½	16,500	210,900	Skelly Oil	No	1,006,348	1.00	....	6.07	4.42
95	95½	94⅞	98	84	102¼	88	500	8,800	6% cum. pfd.	100	66,300	6.00	....	97.86	73.16
27⅛	29⅛	26⅛	35½	24¾	50	26½	61,100	690,000	S. O. Indiana	25	15,235,323	1.00	....	3.06	3.09
50¼	53¼	47¼	58⅜	39¾	76	42	79,200	1,380,200	S. O. New Jersey	25	26,224,767	1.50	....	5.64	3.73
5⅞	6½	5⅛	8	3⅞	15⅜	5¼	11,700	160,200	Tenn. Corp.	5	853,696	....	...	1.09	.41
44⅝	48¼	42¼	49⅝	37⅝	65⅛	34¾	75,600	1,518,000	Texas Corp.	25	11,386,253	2.00	....	5.02	4.10
30¾	32⅝	29¾	38	26	44	23¾	29,300	285,200	Texas Gulf Sulphur	No	3,840,000	2.00	....	3.02	2.57
85⅞	90½	81⅛	90⅞	57	111	61¼	42,100	991,900	Union Carbide & Carbon	No	9,000,743	2.40	....	4.75	4.09
56½	65	54	73½	39	91	36¾	5,800	92,500	United Carbon	No	397,885	3.25	....	5.30	5.54
21½	24⅞	18½	30¼	13½	43⅝	16⅛	6,600	180,900	U. S. Indus. Alcohol	No	391,238	....	....	1.24	—.20
26⅛	30¼	22	28⅞	11½	39⅜	9¼	46,300	430,900	Vanadium Corp. Amer.	No	376,637	....	....	2.22	.40
24⅝	25¼	21¾	25¼	13½	...	...	9,500	49,000	Victor Chem.	5	696,000	.90	....	1.01	1.16
3⅞	4⅞	3½	5⅝	2¾	12¾	2⅛	19,900	183,700	Virginia-Caro. Chem.	No	486,708	....	....	—.05	—2.44
26	31⅞	24¾	32⅛	15¾	74⅜	18½	10,500	142,500	6% cum. part. pfd.	100	213,392	....	....	5.88	.44
19¾	22½	19½	20⅛	10	27¼	10¾	2,900	37,000	Westvaco Chlorine	No	339,362	1.00	....	1.46	1.17
31½	32⅛	30½	31½	20	34⅞	21⅛	2,500	24,400	cum. pfd.	30	192,000	1.50	....	4.09	3.26
NEW YORK CURB EXCHANGE															
24⅛	28⅜	22⅜	30¼	15½	37	17⅝	30,400	494,400	Amer. Cyanamid "B"	10	2,520.368	.45	....	2.09	1.77
86½	90⅜	85	92	50	124	69	900	6,650	Celanese, 7% cum. 1st pfd.	100	148,179	8.53	....	22.32	24.47
...	...	...	6¾	3	15	3	......	12,900	Celluloid Corp.	15	194,952	....	....	—.92	—.80
...	...	...	12	6½	14⅝	10½	......	1,700	Courtauld's Ltd.	£1	24,000,000	.29	....	8.64%	8.30%
6⅛	7	6⅛	9⅞	6	10⅝	3½	300	22,700	Duval Texas Sulphur	No	500,000	....	....	.43	.61
38½	41	38½	41¼	27	47½	31	1,300	7,500	Heyden Chem. Corp.	100	150,000	1.50	....	3.94	3.56
102⅝	108½	100	115½	55	147½	77	7,200	113,100	Pittsburgh Plate Glass	25	2,142,443	1.75	....	8.53	7.15
105	111	102	117¾	66	154¾	72¼	3,850	78,750	Sherwin Williams	25	633,927	2.50	....	8.44	8.04
114	114	113	114⅛	107	114	106¼	50	2,720	5% cum. pfd.	50	137,139	5.00	....	44.01	41.44
PHILADELPHIA STOCK EXCHANGE															
155	167	155	167	121½	179	115	275	5,100	Pennsylvania Salt	50	150,000	4.50	....	11.79	8.57

Price Range: January 1939 Last	January 1939 High	January 1939 Low	1938 High	1938 Low	1937 High	1937 Low	Sales January 1939	Sales 1938	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
101⅛	102	101⅛	105⅜	99⅛	109½	99	265,000	3,640,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$25,300,000
24	25½	24	38	25⅛	42½	23	61,000	1,941,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5	J	12,067,000
107	107	106⅞	106⅛	102⅜	102⅞	100⅛	9,000	510,000	Dow Chemical	1951	3	J-D	5,000,000
102	102½	101⅛	102¾	100	102	98½	7,000	223,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M-N	5,633,000
23	25⅞	22⅝	35⅜	24¾	35⅜	21¼	135,000	2,708,000	Lautaro Nitrate n inc. deb.	1975	4	J-D	30,500,000
...	...	...	35⅜	24¾	25½	20½	......	41,000	Ruhr Chem.	1948	6	A-D	1,500,000
104¼	105	103⅞	105	96½	102	93	618,000	4,918,000	Shell Union Oil	1951	3½	M-S	58,800,000
103½	104¾	103¼	104⅜	90¼	102¾	94	181,000	2,136,000	Skelly Oil	1951	4	J-J	9,000,000
102½	103	102	103	95	105	93½	26,000	237,000	Tenn. Corp. deb. "B"	1944	6	M-S	1,600,000
107⅜	108⅝	106¼	107⅜	103½	105¾	100	259,000	4,111,000	Texas Corp.	1951	3½	J-D	60,000,000
100⅝	101	99	101	77	111	81	102,000	623,000	Vanadium Corp. conv.	1941	5	A-O	2,800,000

* Paid in 1938, including extras but excluding dividends paid in stock. ** For either fiscal or calendar year.

Biennial Census of Manufactures

Preliminary Figures for 1937—p. 5

	1937	1935	1933	Per cent. of increase or decrease (—) 1935-1937	1933-1937
Cottonseed Products					

This industry, as classified for Census purposes, embraces establishments engaged primarily in the crushing of cottonseed and in the production of oil, cake, meal, etc., but it does not cover the activities of plants using cottonseed oil in the further manufacture of lard substitutes and cooking oils.**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	447	458	475	—2.4	—5.9
Wage earners (average for the year)[1]	16,583	13,226	14,242	25.4	16.4
Wages[2]	$8,531,570	$5,911,625	$5,375,712	44.3	58.7
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$195,746,709	$160,540,022	$78,229,307	21.9	150.2
Value of products[2]	$242,042,808	$187,887,305	$104,211,631	28.8	132.3
Value added by manufacture[3]	$46,296,099	$27,347,283	$25,982,324	69.3	78.2

Explosives

This industry, as classified for Census purposes, embraces establishments engaged primarily in the manufacture of black and smokeless powder, dynamite, nitroglycerin, etc. This classification does not cover the production of ammunition nor of fireworks, which are assigned to the "Ammunition and Related Products" and the "Fireworks" industries, respectively.**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	77	74	66	(*)	(*)
Wage earners (average for the year)[1]	5,406	4,570	4,168	18.3	29.7
Wages[2]	$8,620,222	$5,646,701	$4,135,128	52.7	108.5
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$24,212,733	$17,000,618	$12,704,528	42.4	90.6
Value of products[2]	$58,181,337	$40,667,200	$35,105,999	43.1	65.7
Value added by manufacture[3]	$33,968,604	$23,666,582	$22,401,471	43.5	51.6

Glass and Glassware**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	232	213	229	8.9	1.3
Wage earners (average for the year)[1]	79,051	67,138	49,917	17.7	58.4
Wages[2]	$101,587,694	$71,443,178	$57,881,550	42.2	75.5
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$140,705,050	$110,008,152	$73,574,568	27.9	91.2
Value of products[2]	$387,709,563	$283,925,061	$216,264,830	36.6	79.3
Value added by manufacture[3]	$247,004,513	$173,916,950	$142,690,262	42.0	73.1

Glue and Gelatin**

This industry, as classified for Census purposes, embraces establishments engaged principally in the manufacture of glues from vegetable and animal materials including casein, and of edible and inedible gelatin.

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	75	74	63	(*)	(*)
Wage earners (average for the year)[1]	3,547	3,253	2,013	6.3	76.2
Wages[2]	$4,565,134	$3,534,418	$2,032,873	29.2	124.6
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$23,390,959	$15,076,298	$8,328,468	55.2	180.9
Value of products[2]	$40,649,934	$28,161,033	$17,162,712	44.3	136.9
Value added by manufacture[3]	$17,258,975	$13,084,735	$8,834,244	31.9	95.4

Linseed Oil, Cake, and Meal**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	23	25	28	(*)	(*)
Wage earners (average for the year)[1]	2,628	2,350	1,837	11.8	43.1
Wages[2]	$3,591,310	$2,649,697	$2,278,340	35.5	57.6
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$74,481,070	$48,808,968	$50,306,207	52.6	48.1
Value of products[2]	$90,356,528	$60,264,331	$62,882,544	49.9	43.7
Value added by manufacture[3]	$15,875,458	$11,455,363	$12,576,337	38.6	26.2

Lubricating Oils & Greases (not made in petroleum refineries)**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	195	180	158	8.3	23.4
Wage earners (average for the year)[1]	2,231	1,933	1,794	15.4	24.4
Wages[2]	$2,839,411	$2,281,763	$2,086,928	24.4	36.1
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$25,487,284	$20,758,748	$16,773,979	22.3	51.3
Value of products[2]	$44,112,635	$36,068,869	$28,701,505	22.3	53.7
Value added by manufacture[3]	$18,725,351	$15,310,121	$11,927,526	22.3	57.0

Pulp

This industry, as classified for Census purposes, embraces establishments engaged primarily in the production of pulp from wood and other fiber. The greater part of the pulp produced is consumed by paper mills** operated in conjunction with pulp mills.

	1937	1935	1933	1935-1937	1933-1937
Number of establishments[1]	194	188	181	3.2	7.2
Wage earners (average for the year)[2]	26,994	23,627	20,074	14.3	34.5
Wages[3]	$33,570,346	$23,401,212	$18,103,342	43.5	85.4
Cost of materials, supplies, containers, fuel, and purchased electric energy[2]	$153,651,946	$96,176,352	$81,896,058	59.8	87.6
Value of products[3]	$247,191,957	$167,208,261	$134,691,766	47.8	83.5
Value added by manufacture[4]	$93,540,011	$71,031,909	$52,795,708	31.7	77.2

Soap

This industry, as classified for Census purposes, embraces establishments engaged primarily in the manufacture of soap in bars and cakes and in granulated, powdered, and liquid form, and of cleansers, scouring powders and washing compounds *containing soap made in the same factories.* (Manufacturers of similar preparations containing no soap are classified in the Cleaning and Polishing Preparations industry. Some of these manufacturers also make cleansers, etc., containing soap, as secondary products, using purchased soap as a material.)**

	1937	1935	1933	1935-1937	1933-1937
Number of establishments	232	238	235	—2.5	—1.3
Wage earners (average for the year)[1]	14,008	13,911	14,304	0.7	—2.1
Wages[2]	$19,074,574	$15,339,045	$14,140,241	24.4	34.9
Cost of materials, supplies, containers, fuel, and purchased electrical energy[2]	$185,169,789	$139,423,048	$93,507,390	32.8	98.0
Value of products[2]	$301,291,547	$239,152,130	$200,127,929	26.0	50.5
Value added by manufacture[3]	$116,121,758	$99,729,082	$106,620,539	16.4	8.9

** Plants with annual production valued at less than $5,000 excluded. * Per cent. not computed where base is less than 100.

[1] Not including salaried officers and employees. Data for such officers and employees will be included in a later report. The item for wage earners is an average of the numbers reported for the several months of the year. In calculating it, equal weight must be given to full-time and part-time wage earners (not reported separately by the manufacturers), and for this reason it exceeds the number that would have been required to perform the work done in the industry if all wage earners had been continuously employed throughout the year. The quotient obtained by dividing the amount of wages by the average number of wage earners cannot, therefore, be accepted as representing the average wage received by full-time wage earners. In making comparisons between the figures for 1937 and those for earlier years, the possibility that the proportion of part-time employment varied from year to year should be taken into account.

For additional Biennial Census of Manufactures data see January, 1939, pages 109, 110, 111, 112.

Biennial Census of Manufactures
Preliminary Figures for 1937—p. 5

Biennial Census of Manufactures

Preliminary Figures for 1937—p. 6

[2] Profits or losses cannot be calculated from the Census figures because no data are collected for certain expense items such as interest, rent, depreciation, taxes, insurance, and advertising.

[3] Value of products less cost of materials, supplies, containers, fuel, and purchased electric energy.

Acids (Production)

Production of practically all acids increased in 1937 over 1935 and the combined value of the 1937 output reached a total of $87,657,748, an increase of 34% as compared with 1935.

Production of sulfuric acid for sale increased 27.4% from 4,488,148 tons in 1935 to 5,718,592 tons in 1937. Production for consumption in the same plants amounted to 2,100,051 tons in 1937 as compared with 1,943,979 in 1935. For acetic acid, the report shows an increase of 29.7% from 101,500,662 lbs. in 1935 to 131,644,596 lbs. in 1937. Statistics for 1937 in comparison with 1935 are given in the following table. All figures for 1937 are preliminary and subject to revision.

Acids—Production, by Kind, Quantity, and Value: 1937, 1935, and 1933
(All quantity figures represent production for sale unless otherwise specified)
(Ton, 2,000 lbs.)

	1937	1935
Acids, total value	$87,657,748	$65,389,561
Acetic (basis 100 per cent.):[1]		
Number of establishments	24	13
Pounds	131,644,596	101,500,662
Value	$6,607,187	$5,455,362
Boric (boracic):		
Number of establishments	3	3
Pounds	40,524,000	28,738,000
Value	$1,545,304	$1,245,874
Chromic:		
Number of establishments	4	4
Pounds	8,997,337	6,723,304
Value	$1,260,477	$887,842
Citric:		
Number of establishments	4	4
Pounds[2]	18,138,263	10,493,068
Value	$4,118,513	$2,768,377
Hydrochloric:		
Number of establishments	34	33
Total production (basis 100 per cent.), tons	121,473	87,090
Made and consumed in same establishments, tons	50,307	32,201
For sale:		
Tons	71,166	54,889
Value	$3,987,974	$3,048,159
From salt:		
Number of establishments	19	19
Tons	53,027	47,098
Value	$3,048,182	$2,656,028
From chlorine, by-product and other:		
Number of establishments	11	13
Tons	18,139	7,791
Value	$939,792	$392,131
Hydrofluoric (basis 100 per cent.):		
Number of establishments	6	5
Pounds	4,395,696	2,993,273
Value	$701,314	$471,327
Mixed (sulfuric-nitric):		
Number of establishments	20	16
Tons	54,432	46,074
Value	$2,466,864	$2,105,231
Nitric:		
Number of establishments	30	30
Total production (basis 100 per cent.), tons	175,860	96,109
Made and consumed in same establishments, tons	140,450	71,609
For sale:		
Tons	35,410	24,500
Value	$3,052,576	$2,142,817
Oleic:		
Number of establishments	12	12
Pounds	38,086,766	43,763,371
Value	$3,604,790	$3,273,421
Oxalic:		
Number of establishments	4	4
Pounds	10,197,652	8,883,521
Value	$1,086,878	$945,215
Phosphoric:		
Number of establishments	13	11
Pounds[5]	135,144,840	45,385,991
Value	$2,788,600	$1,333,702
Pyrogallic:		
Number of establishments	3	3
Pounds	118,669	86,516
Value	$138,326	$115,802
Stearic:		
Number of establishments	12	12
Pounds	31,888,647	27,438,289
Value	$3,656,422	$2,776,935
Sulfuric:[6]		
Number of establishments	147	155
Total production (basis 50° Baumé), tons	7,818,643	6,432,127
Made and consumed in same establishments, tons	2,100,051	1,943,979
For sale:		
Tons	5,718,592	4,488,148
Value	$42,197,855	$31,907,994
Production by process:		
Contact:		
Number of establishments	62	65
Total production tons	3,651,028	3,431,427
Made and consumed in same establishments, tons	664,608	834,534
For sale:		
Tons	2,986,420	2,596,893
Value	$23,559,427	$19,457,633
Chamber:		
Number of establishments	100	101
Total production, tons	4,167,615	3,000,700
Made and consumed in same establishments, tons	1,435,443	1,109,445
For sale:		
Tons	2,732,172	1,891,255
Value	$18,638,428	$12,450,361
Tannic:		
Number of establishments	4	6
Pounds[3]	1,015,914	724,552
Value	$381,847	$304,728
Tartaric:		
Number of establishments	4	4
Pounds	10,642,838	6,887,121
Value	$2,484,625	$1,609,027
Other acids, value	$7,578,196	$4,997,748

[1] Synthetic, natural, dilute, and glacial; [2] For 1937 and 1935, 100 per cent.; [3] No data; [4] No comparable data; [5] For 1937 and 1935, basis 50 per cent. H_3PO_4; [6] Data for production by establishments classified in Lead Smelting and Refining and Copper Smelting industries included in figures for 1937 and 1935.

Blackings, Stains, etc.

	1937	1935
1. Blacking, Stains, and Dressings industry, all products, total value	$19,182,557	$17,931,563
2. Blacking, stains, dressings (including shoe and other leather and stove polishes)	17,855,378	15,613,904
3. Other products (not normally belonging to the industry)	1,327,179	2,317,659
4. Blacking, stains, dressings, etc., made as secondary products in other industries, value	1,006,348	959,713
Blacking, stains, and dressings, total value (sum of 2 and 4)	18,861,726	16,573,617
Blacking	1,094,103	1,641,029
Stains	1,168,992	861,181
Dressings (waxes, automobile-top, etc.)	1,062,493	1,295,991
Boot and shoe polishes, total	13,197,614	10,831,810
White	4,309,600	(1)
Other	8,533,932	
Not specified	354,082	
Other leather polishes (harness, belting, etc.) and stove polish	2,238,524	1,943,606

[1] No data.

Calcium Oxychloride

(Bleaching Powder)

	1937	1935
No. of Est.	14	16
Tons	45,908	39,561
Value	$937,197	$909,071

Chlorine

	1937	1935
No. of Est.	25	22
Total prod., tons	446,261	315,139
Made and consumed in same establishments, tons	160,301	107,759
Made for sale:—		
No. of Est.	22	19
Tons	285,960	207,380
Value	$10,416,672	$7,961,186

Cottonseed Products

	Season (12 months) Ended July 31 1937	1935
Crude cottonseed products, total value[1]	$229,183,000	$177,738,000
Oil:		
Pounds	1,363,978,069	1,108,582,294
Value	$123,189,000	$91,849,000
Cake and meal:		
Tons (2,000 pounds)	2,031,488	1,614,345
Value	$65,783,000	$54,023,000
Hulls:		
Tons (2,000 pounds)	1,144,138	913,039
Value	$10,472,000	$10,260,000
Linters:		
Bales	1,126,873	805,083
Value	$29,739,000	$21,606,000
Cottonseed crushed, tons (2,000 pounds)	4,498,321	3,549,891

[1] The differences between these totals and the values of products given in other table on Cottonseed products for the corresponding years are due in part to the inclusion in table 1 of data for the values of refined cottonseed oil and minor products and receipts for ginning, and in part to the fact that the figures in table 1 cover calendar years, whereas those in this table refer to seasons ended July 31.

Explosives

	1937	1935
"Explosives" industry, all products, total value	$58,181,337	$40,667,200
Explosives (including consumption in shooting wells on contract[1])	$48,764,985	$34,655,156
Other products (not normally belonging to the industry)	$9,416,352	$6,012,044
Explosives (including consumption in shooting wells on contract[1]):		
Total pounds	438,523,911	338,116,413
Total value[1]	$48,764,985	$34,655,156
Dynamite:		
Pounds	256,647,677	191,190,664
Value	$26,949,869	$19,715,009
Permissible explosives:[2]		
Pounds	71,289,248	47,990,826
Value	$7,466,338	$4,985,657
Nitroglycerin:		
Consumed in shooting wells on contract and made for sale, pounds	3,433,594	2,483,262
Amount received for shooting wells on contract[1] and value of production for sale	$1,636,919	$818,748
Explosives (Cont'd)		
Blasting powder:		
Pounds	32,192,875	35,153,125
Value	$2,009,925	$2,147,814
Pellet powder:		
Pounds	33,423,657	31,467,150
Value	$2,137,152	$2,076,261
Fuse powder:		
Pounds	2,438,775	1,477,975
Value	$438,109	$231,654
Gunpowder (black and smokeless) and other explosives not specified above:		
Pounds	39,098,085	28,353,411
Value	$8,126,673	$4,680,013

[1] Amount received for shooting wells is treated as value of nitroglycerin used for this purpose.
[2] Those approved by the Bureau of Mines, Department of the Interior, as suitable for use in mines where dust and gas explosions are likely to occur.

Inks, Printing

	1937	1935
1. Printing ink industry, all products, total value	$47,346,545	$34,534,951
2. Printing and lithographing inks (finished)		
Pounds	247,914,914	148,913,601
Value	$44,650,915	$32,151,519
3. Other products, including base ink (not normally belonging to the industry), value	$2,695,630	$2,383,432
4. Printing and lithographing inks (finished) made as secondary products in other industries		
Pounds	9,327,291	1,671,427
Value	$2,074,532	$409,805
Printing and lithographing inks (finished), total (sum of 2 and 4):		
Pounds	257,242,205	150,585,028
Value	$46,725,447	$32,561,324

Linseed Oil, Meal and Cake

	1937	1935
Linseed oil, cake and meal industry all products, total value	$90,356,528	$60,264,331
Oil, cake, and meal[1]	$81,269,312	$56,659,356
Other products[2]	$9,087,216	$3,604,975
Linseed oil, cake, and meal:		
Oil:[1]		
Pounds	638,171,128	483,025,310
Value	$59,848,229	$43,271,858
Cake and meal:[1]		
Tons	587,832	470,760
Value	$21,421,083	$13,387,498

Plastics

Total production of plastics in '37 by establishments in the chemical industry was valued at $60,465,370, an increase of 37.3% as compared with $44,035,686 reported for '35. Coal-tar resins show an increase of 50.0% in quantity and 50.5% in value, from 87,718,953 lbs., valued at $15,672,401 for '35 to 131,568,162 lbs., valued at $23,583,627 for '37. All figures for '37 are preliminary.

Plastics—Production, by Kind, Quantity and Value: 1937, 1935.

(Data on production of photographic-film base and wrapping materials are not included in this report)

	1937	1935
Plastics, total value	$60,465,370	$44,035,686
Nitrocellulose (pyroxylin):		
Number of establishments	11	13
Total production, not including finished articles, pounds	18,122,788	16,299,519
Made and consumed in same establishments, pounds	3,271,971	2,958,859
Produced for sale:		
Pounds	14,850,817	13,340,660
Value	$12,526,206	$10,682,358
Finished articles of nitrocellulose (pyroxylin) made in producing establishments in "Chemicals not Elsewhere Classified" industry, value[1]	$4,389,159	$5,116,420
Cellulose acetate:		
Number of establishments	6	6
Pounds	18,923,663	10,395,290
Value	$12,199,744	$7,986,489
Coal-tar resins:		
Total pounds	[2]131,568,162	[2]87,718,953
Total value	[2]$23,583,627	[2]$15,672,401
Derived from—		
Phenol and/or cresol:		
Number of establishments	20	20
Pounds	89,944,210	52,326,946
Value	$16,762,554	$9,929,904
Phthalic anhydride:		
Number of establishments	10	10
Pounds	25,561,432	17,900,745
Value	$4,530,695	$2,946,897
Other coal-tar resins:		
Number of establishments	9	7
Pounds	16,062,520	17,491,262
Value	$2,290,378	$2,795,600
Other plastics and synthetic resins, including synthetic rubber, value	$7,766,634	$4,578,018

[1] In addition, nitrocellulose articles are made from purchased nitrocellulose plastics by establishments in certain other industries, including "Synthetic-Resin, Cellulose-Plastic, Vulcanized-Fiber, and Molded and Pressed Pulp Fabricated Articles, Not Elsewhere Classified," "Brushes, Other than Rubber," and "Pens, Fountain and Stylographic," etc.
[2] Includes data for an indeterminable amount of materials used as fillers, such as wood flour, etc. See also Tariff Commission report No. 132, 1937, entitled "Dyes and Other Synthetic Organic Chemicals in the United States, 1937."

Potassium Hydroxide

(Caustic Potash)

	1937	1935
No. of Est.	5	4
Tons	10,822	9,518
Value	$1,437,509	$1,260,031

Biennial Census of Manufactures
Preliminary Figures for 1937—p. 7

Biennial Census of Manufactures

Preliminary Figures for 1937—p. 8

Soap

	1937	1935
1. Soap industry, all products, total value	$301,291,547	$239,152,130
2. Soap	$257,877,539	$211,004,391
3. Other products (not normally belonging to the industry)	$43,414,008	$28,147,739
4. Soap made as a secondary product in other industries, value	$13,699,695	$12,804,189
Soap, aggregate value (sum of 2 and 4)	$271,577,234	$223,808,580
Bar soaps:		
Toilet soaps:		
Pounds	360,610,753	352,976,104
Value	$62,805,065	$53,324,747
Laundry soaps:		
White:		
Pounds	488,979,981	420,524,270
Value	$28,192,491	$19,937,559
Yellow:[1]		
Pounds	633,441,319	713,540,726
Value	$33,195,616	$31,402,714
Granulated, powdered, and sprayed soaps:		
Pounds	743,194,783	503,117,738
Value	$68,408,836	$45,283,702
Soap chips and flakes:		
Packaged:		
Pounds	274,275,994	307,274,876
Value	$28,207,372	$25,615,958
Bulk:		
Pounds	116,179,494	151,659,892
Value	$9,797,688	$10,713,357
Washing powders:		
Packaged:		
Pounds	146,924,947	132,681,612
Value	$6,582,021	$5,535,464
Bulk:		
Pounds	83,504,344	86,366,692
Value	$2,481,397	$2,210,182
Cleansers and scouring powders containing soap:[2]		
Packaged:		
Pounds	157,039,241	196,233,597
Value	$6,254,838	$6,186,478
Bulk:		
Pounds	21,307,024	37,353,855
Value	$917,323	$1,501,227
Shaving soaps, total value	$9,729,538	$9,218,385
Stick, powder, and cake, total value	$1,954,272	$2,273,911
Quantity reported:		
Pounds	5,075,521	6,152,233
Value	$1,954,272	$2,119,581
Quantity not reported, value	......	$154,330
Cream (soap base) total value	$7,775,266	$6,944,474
Quantity reported:		
Pounds	9,555,764	6,716,026
Value	$7,775,266	$5,695,920
Quantity not reported, value	......	$1,248,554
Liquid soaps, not including packaged shampoos, total value	$2,398,086	$1,972,821
Quantity reported:		
Pounds	29,224,168	22,592,738
Value	$2,398,086	$1,523,154

Soap (Cont'd)	1937	1935
Quantity not reported, value	......	$449,667
Soap stock or soap base, made for sale as such:[2]		
Pounds[2]	4,521,988	3,665,376
Value[2]	$346,947	$270,406
Bar cleansers containing soap:		
Pounds	5,446,732	9,882,633
Value	$410,544	$471,884
Hand pastes or mechanics' pastes:		
Pounds	16,930,579	14,174,407
Value	$1,062,295	$792,004
Textile soaps, including potash and foots soaps for textile manufacture:		
Pounds	60,016,699	70,052,236
Value	$5,309,816	$5,350,238
Potash soaps, other than textile and liquid:		
Pounds	25,071,652	20,803,830
Value	$2,156,599	$1,483,537
Soap not reported according to classifications above, value	$3,320,762	$2,537,917

[1] Consumption of rosin used in the manufacture of soap in 1937 amounted to 75,450,320 pounds. No data available for 1935; [2] Produced by establishments classified in the Soap industry only.

Sodium Compounds

Sodium Bicarbonate (ref'd)

	1937	1935
No. of Est.	5	4
Tons	142,161	136,556
Value	$3,606,271	$3,658,321

Sodium Hydroxide

(Caustic Soda)

	1937	1935
No. of Est.	29	30
Total prod., tons	961,591	759,381
Made & consumed in same establishments, tons	71,315	39,171
Made for sale:—		
Tons	890,276	720,210
Value	$31,797,329	$28,134,175
By process: — Electrolytic—		
No. of Est.	23	22
Total prod., tons	472,784	322,401
Made and consumed in same establishments, tons	64,442	34,881
Made for sale:—		
Tons	408,342	287,520
Value	$13,906,703	$11,263,248
Lime-soda:—		
No. of Est.	11	11
Total prod., tons	488,807	436,980
Made and consumed in same establishments, tons	6,873	4,290
Made for sale:—		
Tons	481,934	432,690
Value	$17,890,626	$16,870,927

Sodium Hypochlorite

	1937	1935
No. of Est.	58	53
Tons (basis 15%)	74,443	50,807
Value	$6,229,359	$2,073,133

Sodium Sulfide

	1937	1935
No. of Est.	12	13
Tons (60-62%)	26,314	24,884
Value	$1,529,592	$1,390,001

For additional Biennial Census of Manufactures Statistics see January, 1939, pages 109, 110, 111, 112.

Pulp

Products, by Kind, Quantity, and Value

	1937		1935	
	Tons (2,000 lbs.)	Value (f.o.b. mill)	Tons (2,000 lbs.)	Value (f.o.b. mill)
Pulp industry, all products, total value	......	$247,191,957	......	$167,208,261
Pulp (wood and other fiber)	6,757,842	244,667,297	5,032,299	165,322,871
Products other than pulp (not normally belonging to the industry)	......	2,524,660	......	1,885,390
Wood pulp, total	6,617,184	227,796,971	4,925,669	149,981,900
Mechanical, total	1,600,667	30,315,251	1,355,819	24,972,104
Not steamed	1,513,047	28,281,135	1,205,199	22,224,975
Steamed	87,620	2,034,116	150,620	2,747,129
Sulfite, total	2,162,771	111,029,418	1,579,567	70,425,758
Unbleached	814,102	31,827,729	634,947	21,909,660
Bleached, total	1,348,669	79,201,689	944,620	48,516,098
Superpurified and rayon and special chemical grades[1]	353,640	23,871,039	189,536	11,987,887
Other bleached	995,029	55,330,650	755,084	36,528,211
Sulfate, total	2,160,826	60,552,279	1,467,749	36,008,886
Unbleached	1,945,676	52,211,166	1,340,288	31,213,254
Bleached	215,150	8,341,113	127,461	4,795,632
Soda, unbleached and bleached, total	507,548	23,465,719	......	......
Semi-chemical and other wood pulp,	......	......	[2]485,162	[2]18,165,468
total	132,521	1,748,316	......	......
Screenings, total	52,851	685,988	37,372	409,684
Mechanical	9,674	69,667	3,902	22,146
Chemical	43,177	616,321	33,470	387,538
Other pulp[3]	140,658	16,870,326	106,630	15,340,971

[1] Combined to avoid disclosing data for individual establishments for 1937. The production of superpurified pulp in 1935 was reported as 63,066 tons, valued at $4,817,774.

[2] Soda and semi-chemical pulp only. Combined to avoid disclosing production reported by an individual establishment.

[3] Cottonseed-hull-fiber pulp, cotton-linter pulp, rag pulp, and reclaimed paper and straw pulp.

NITROGEN WORLD FIGURES

Production

Annual nitrogen statistics of the British Sulphate of Ammonia Federation in Table 1 are offered as fair estimates, but strict accuracy is not claimed by the Federation. The estimates for 1935/36 and 1936/37 have been slightly revised.

The following figures are offered as fair estimates, but strict accuracy is not claimed for them. The estimates for 1935/36 and 1936/37 have been slightly revised. The percentage increases or decreases as compared with the previous year are shown in italics.

During the year under review it is estimated that there was an increase of 183,000 metric tons of nitrogen, or about 6.8%, in the actual production of the forms of nitrogen enumerated in Table 1. Production in Chile increased by 18,000 tons, or 9%, and output in other countries increased by 165,000 tons, or 7%. As indicated by the asterisks, 1937/38 was a record year for the output of most of the products shown.

As in the previous year, the most marked increases in the output of manufactured nitrogen have been in Germany and the Japanese Empire; but in the U. S. there was a decrease.

Synthetic nitrogen plants have on an average operated at only about 53% of capacity during the year: the world production capacity for synthetic nitrogen, including cyanamid, is estimated at roughly 4,100,000 tons of nitrogen.

Consumption

The total consumption increased by 141,678 tons, or about 5.2%, following an increase of 11.9% last year.

The increase in fertilizer nitrogen consumption was 123,000 metric tons, or 5.2% as compared with 12.5% in the previous year. Each main class of fertilizer showed an increase; ammonium sulfate (including ammonia for mixed fertilizers) increased by 59,421 tons of nitrogen, or 5.1% over the 1936/37 figure, Chile nitrate by 14,122 tons (5.9%), calcium cyanamid by 10,503 tons (3.7%), and "other synthetic nitrogen fertilizers" by 52,780 tons (7.5%).

In individual countries the largest tonnage changes in fertilizer nitrogen consumption have been increases in Germany, the Japanese Empire, Spain and Italy, and decreases in the U. S. and China. The Spanish consumption is, however, still far below its peace-time level; and in China most of the large advance made in 1936/37 has been lost.

The increase in consumption in Europe is very impressive—141,659 tons N for fertilizer nitrogen alone. Almost half of this was due to Germany, which also accounted for about half of the European

Table 1. World Production and Consumption Pure Nitrogen for the Fertilizer Years

(Ended 30th June in Thousands of Metric Tons)

Production:	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38
Sulfate of Ammonia:										
Synthetic	485	442	349	522	560	535	533	630	688	765*
By-product ...	376	425	360	302	258	307	321	376	429*	411
	861	867	709	824	818	842	854	1,006	1,117	1.176*
Cyanamid	192	264	201	134	168	195	232	269	291	305*
Nitrate of Lime ..	136	131	110	79	118	107	153	156	179	195*
Other forms of Nitrogen†										
Synthetic	383	427	393	348	462	516	607	724	851	931*
By-product ...	51	51	31	30	40	48	45	46	53	49
Chile Nitrate	490*	464	250	170	71	84	179	192	206	224
Total production	2,113	2,204	1,694	1,585	1,677	1,792	2,070	2,393	2,697	2 880*
Percentage Increase or Decrease	+22.6%	+4.3%	—23.1%	—6.4%	+5.8%	+6.9%	+15.5%	+15.6%	+12.7%	+6.8%
Consumption										
Manufactured Nitrogen	1,453	1,587	1,377	1,417	1,620	1,714	1,877	2,223	2,492	2,620*
Chile Nitrate	419*	364	244	138	127	164	195	218	238	252
Total consumption	1,872	1,951	1,621	1,555	1,747	1,878	2,072	2,441	2,730	2,872*
Percentage Increase or Decrease	+14.0%	+4.2%	—16.9%	—4.1%	+12.3%	+7.5%	+10.3%	+17.8%	+11.9%	+5.2%
Agricultural consumption about .	1,670	1,750	1,455	1,412	1,586	1,673	1,812	2,106	2,369	2,492*
Percentage Increase or Decrease	+14.4%	+4.8%	—16.9%	—3.0%	+12.3%	+5.5%	+8.3%	+16.2%	+12.5%	+5.2%

* Highest figure ever reached.

† Including nitrogen products used for industrial purposes (except Chile nitrate) and ammonia in mixed fertilizers.

NOTE.—Fertilizers are included in these tables under the final form as sold, so that, for example, cyanamid if converted into sulfate of ammonia is included under synthetic sulfate of ammonia, or, if into ammophos, under other synthetic nitrogen.

Table 2. Balance of Exports of Ammonium Sulfate

(In metric tons of nitrogen calculated at 20.6%)

Balance of Exports from

Calendar Year	Great Britain and Ireland	United States‡	Germany	Other European Countries§	British Empire Countries¶	Total
1929	120,381	26,310	149,680†	13,666	4,255‖	314,292
1930	111,757	10,021	86,298†	36,814	1,605‖	246,495
1931	78,281	.....	125,878†	51,010	....	255,169
1932	81,062	.....	77,238	98,671	5,136‖	262,107
1933	61,457	.....	91,872	72,381	11,995‖	237,705
1934	56,274	.....	73,982	74,681	8,720‖	213,657
1935	47,443	.....	90,059	95,513	7,620‖	240,635
1936	38,665	.....	63,330	85,043	14,970‖	202,008
1937	59,590	.....	73,451	112,738	9,952‖	255,731

* May to December only; † Including reparations deliveries; ‡ Not including exports from U. S. but including imports from other countries to the non-contiguous territories of Alaska, Hawaii and Porto Rico; § Poland, Belgium, Holland, Czechoslovakia, Italy, Sweden, Norway, Austria, Hungary, Rumania and Russia; ¶ Canada, Australia, India, S. Africa and New Zealand; ‖ All from Canada.

Table 3. British Ammonium Sulfate Exports

(Tons of 2,240 lb.)

	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38
Spain, Portugal, Canaries	221,380	166,519	184,167	137,570	114,585	93,349	33,254	40,008	39,921
Japan	158,971	52,062	52,159	3,000	64,315	7,025	201	.....	.....
China and Hong Kong	109,888	72,206	44,314	59,817	13,441	6,950	12,221	36,726	41,194
West Indies, British Guiana and Mauritius	16,263	16,101	22,859	30,952	22,534	25,361	34,626	39,557	41,671
India and Ceylon	37,312	21,150	35,421	48,771	51,274	58,172	58,621	57,502	65,547
Australia and New Zealand ..	20,083	15,151	9.498	25,869	13,285	18,781	30,634	27,884	32,254
South and East Africa ...	2,143	1,769	3,220	7,440	8,586	9,927	9,556	9,900	16,689
Malaya	2,625	1,996	651	360	2,260	4,625	8,624	20,302	32,128

See also Statistical & Technical Data Section, January, 1938, pages 121 and 122 for comparative nitrogen statistics.

Nitrogen

World Trade Fertilizer Year 1937-38—p. 2

increase in ammonium sulfate and three-quarters of that in other synthetic nitrogen fertilizers. Of the decrease in the consumption of fertilizer nitrogen in the American continent (35,459 tons N) about 90% was in the U. S.

The order of importance in the production and consumption of nitrogen for agricultural use remains roughly as in recent years, viz.: ammonium sulfate 47-48% of all fertilizer nitrogen; cyanamid 12%; Chile nitrate 9-10%; lime ammonium nitrate ("Nitro-chalk" forms) 9-10%; calcium nitrate 7-8%; sodium nitrate (for fertilizer) 3%; and other synthetic nitrogenous fertilizers 11-12%.

The international agreements mentioned in earlier Reports have been renewed for a further period of 3-5 years.

British Isles

The total consumption of pure nitrogen in the British Isles for agricultural purposes amounted to about 68,200 metric tons against 65,700 tons last year, an increase of 3.8%.

Total exports of ammonium sulfate from Great Britain and Ireland show an increase of 44,711 tons or about 18% on last year's figures.

Chilean Nitrate Industry

The annual report of the Chilean Nitrate and Iodine Sales Corp. for the fiscal year ended June 30, 1938, contains several interesting statements relating to the activities during the year under review.

The Sales Corporation handles all sales of Chilean nitrate and iodine. On June 30 there were 19 nitrate plants in operation, whereof two are producers of granulated nitrate and the remainder of crystallized (Shanks) nitrate. Production was initiated during the year under review at the "Concepcion" plant and was discontinued at the plants of "La Valparaiso."

(Metric Tons)

Year	Production	Shipments	Sales	Stocks at end of year
1932-33	447,350	269,841	821,791	2,259,655
1933-34	529,877	1,182,393	1,021,271	1,768,261
1934-35	1,135,546	1,270,964	1,274,440	1,629,367
1935-36	1,216,347	1,342,019	1,346,000	1,499,714
1936-37	1,290,276	1,499,830	1,561,536	1,228,454
1937-38	1,420,312	1,544,001	1,578,108	1,070,658

Productive Capacity

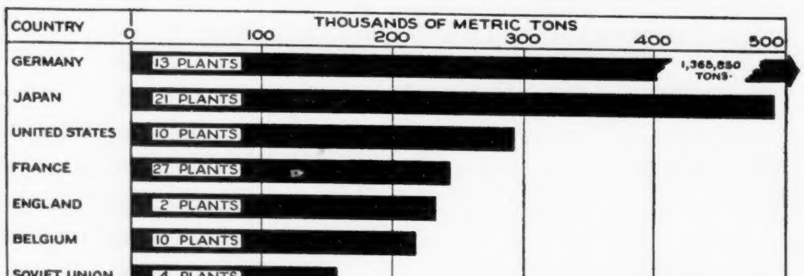
A comprehensive statistical study of the world nitrogen industry has been published under the title, "Nitrogen Fixation Works in the World," by Chisso Kyogi Kai, Tokyo, Japan, by the operators of a large synthetic ammonia plant at Konan, Chosen. From this study it would appear that the number of nitrogen fixation plants has grown from 113 in 1931 to 145 in 1937. All of the new construction has consisted of synthetic ammonia plants. Capacity for all types of nitrogen fixation has increased 50%, according to the study.

Table 4. World Consumption of Pure Nitrogen
(In metric tons)

Continent	Fertilizer Year	Ammonium Sulfate and Ammonia for Mixed Fertilizers	Chile Nitrate	Calcium Cyanamid	Other Synthetic Nitrogen Fertilizers	Nitrogen Products for Industrial Purposes (excl. Chile nitrate)	Total
Europe (incl. U.S.S.R.)	1934-35	453,687	83,281	171,604	398,117	105,769	1,212,458
	1935-36	508,394	91,723	202,627	472,997	146,615	1,422,356
	1936-37	489,215	92,222	206,399	557,676	156,031	1,501,543
	1937-38	546,641	112,956	209,710	617,864	162,204	1,649,375
Africa	1934-35	15,113	24,369	218	32,834	8,234	80,768
	1935-36	14,930	28,283	167	47,892	12,286	103,558
	1936-37	16,741	28,863	384	51,148	13,489	110,625
	1937-38	19,937	27,645	792	47,403	14,406	110,183
Asia	1934-35	292,002	5,351	35,434	18,134	21,724	372,645
	1935-36	344,924	5,816	41,101	32,557	35,257	459,655
	1936-37	440,458	6,333	48,873	31,160	43,152	569,976
	1937-38	458,444	6,402	58,456	28,001	46,918	598,221
Oceania (incl. Hawaii)	1934-35	16,646	2,081	......	2,251	1,644	22,622
	1935-36	21,342	2,505	......	2,557	2,208	28,612
	1936-37	20,292	3,725	......	2,287	2,260	28,564
	1937-38	24,577	7,018	......	2,215	2,580	36,390
America	1934-35	124,522	80,023	17,002	48,332	113,144	383,023
	1935-36	144,623	89,832	17,831	43,757	130,279	426,322
	1936-37	192,025	106,813	25,966	58,316	136,497	519,617
	1937-38	168,553	98,057	23,167	57,884	130,173	477,834
World	1934-35	901,970	195,105	224,258	499,668	250,515	2,071,516
	1935-36	1,034,213	218,159	261,726	599,760	326,645	2,440,503
	1936-37	1,158,731	237,956	281,622	700,587	351,429	2,730,325
	1937-38	1,218,152	252,078	292,125	753,367	356,281	2,872,003

Table 5. Development of Nitrogen Fixation in the World
(Metric Tons)

Country	1931 Plants	1931 Capacity	1935 Plants	1935 Capacity	1937 Plants	1937 Capacity
Germany	12	1,037,000	13	1,098,000	13	1,365,850
Japan	20	245,290	19	343,200	21	490,132
United States	8	203,650	10	244,340	10	292,510
France	22	207,550	27	241,090	27	244,050
England	2	185,500	2	145,870	2	232,870
Belgium	5	38,500	10	204,360	10	217,980
Russia	1	7,300	4	100,100	4	157,500
Italy	14	90,250	16	109,200	18	146,860
Netherlands	2	34,000	3	106,000	3	136,650
Norway	3	108,000	4	121,000	4	121,000
Canada	2	73,200	3	102,000	3	102,000
Poland	6	99,000	5	84,190	5	88,930
Manchukuo	..	.....	1	40,000	1	40,000
Czechoslovakia	3	17,500	4	37,640	4	37,640
Yugoslavia	3	19,000	3	23,900	3	23,900
All others	10	35,700	15	55,490	17	65,451
	113	2,401,440	139	3,056,380	145	3,763,323



Chart, Courtesy Chemical Division, Bureau of Foreign & Domestic Commerce.

U. S. Chemical Patents

Off. Gaz.—Vol. 497, Nos. 1, 2, 3, 4—p. 77

Agricultural Chemicals

Production granular mixed fertilizers from mixture of calcium and magnesium carbonates, and ammonium chloride and water. No. 2,140,340. Friedrich Vogel, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Cellulose

Preparatory treatment for manufacture of viscose having a normal viscosity from unaged alkali cellulose, using sulfurizing process, in final step producing cellulose xanthate. No. 2,139,302. Jacob de Booys, Breda, Netherlands, to American Enka Corp., Enka, N. C.

Process purifying and, at the same time, stabilizing a crude cellulose triacetate. No. 2,140,347. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., New York City.

Method refining organic acid esters of cellulose. No. 2,140,543. Dennis E. Northrop and Robt. C. Burton, Kingsport, Tenn., to Eastman Kodak Co., Jersey City, N. J.

Production cellulose derivative by causing an alkylating agent to react with alkali metal cupric cellulose. No. 2,140,568. Wilhelm Traube, Berlin, Germany, three-sevenths to N. V. Allgemeene Chemische en Technische Maatschappij "Achetem", Hague, Netherlands.

Preparation cellulose acetate. No. 2,140,639. Carl J. Malm and Loring W. Blanchard, Jr., to Eastman Kodak Co., all of Rochester, N. Y.

Preparation cellulose derivative composition. No. 2,140,745. Robt. T. Hucks, South River, N. J., to du Pont, Wilmington, Del.

Production pure white cellulose with properties particularly valuable for subsequent use. No. 2,140,863. Erik Bror Fredrik Sunesson, Skoghall, Sweden, to Uddeholms Aktiebolag, Uddeholm, Sweden.

Production non-fibrous cellulosic pellicles, drying pellicles by passing same over a heated, unsealed, anodized aluminum surface. No. 2,141,377. Stanislas Chylinski to du Pont, both of Wilmington, Del.

Manufacture viscose, involving the admixture of cellulose fibre, caustic soda solution, and liquid carbon bisulfide. No. 2,141,669. Geo. A. Richter and Harold P. Vannah to Brown Co., all of Berlin, N. H.

Chemical Specialty

Bonded abrasive article comprising aluminous abrasive grain and a binder comprising the hydrothermal reaction products of CaO, SiO_2 and Al_2O_3. No. 2,138,829. Raymond C. Benner and Peter de Leeuw to Carborundum Co., all of Niagara Falls, N. Y.

Bonded abrasive article comprising abrasive grain and the hydrothermal reaction product of CaO, SiO_2 and Al_2O_3. No. 2,138,830. Raymond C. Benner and Peter de Leeuw, to Carborundum Co., all of Niagara Falls, N. Y.

Means and method for protection from marine parasites. No. 2,138,831. Fred G. Brammer, No. Olmstead, Ohio.

Production lubricating oil having a high viscosity index from a mineral oil containing naphthenic and paraffinic constituents. No. 2,138,832. Arthur B. Brown, Hammond, Ind., and Fred F. Diwocky, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Production lubricating oil having a high viscosity index and a low true color from a mineral oil containing naphthenic and paraffinic constituents. Nos. 2,138,833-4. Arthur B. Brown, Hammond, Ind., and Fred F. Diwocky, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Lubricant comprising a hydrocarbon oil and a phosphine oxide. No. 2,138,835. John G. Butz to Atlantic Refining Co., both of Phila., Pa.

Manufacture carbon paper for use in a transfer process, having a color layer of porous and unglazed character comprising a color paste of an oil-soluble salt of a basic dye, a wax, a high molecular weight fatty alcohol, and a readily volatile solvent. No. 2,138,836. Paul V. Brower, Maywood, Ill., to Ditto, Inc., corp. of W. Va.

Coated abrasive. No. 2,138,882. Norman P. Robie to Carborundum Co., both of Niagara Falls, N. Y.

Production transparent, rubbery sheet, comprising a polyvinyl acetal resin and, as an elasticizer, a mixture composed of diphenyl ether and a lower dialkyl phthalate. No. 2,138,889. Henry B. Smith and Donald R. Swan, to Eastman Kodak Co., all of Rochester, N. Y.

Manufacture waterproof, permanently soft and elastic shaped products. No. 2,138,909. Egon Elod, Karlsruhe, and Ernst Demme, Weinheim, Germany, to Carl Freudenberg G. m. b. H., Weinheim, Germany.

Transfer sheet for use in decorating rubber comprising a support, and a layer of an ink including rubber, zinc oxide, magnesium carbonate, titanium white, coloring matter, sulfur and an accelerator. No. 2,139,068. Pierre Marcel Bourden, Paris, France, to Michelin et Cie, Clermont-Ferrand, France.

Method lubricating bearings with lubricant comprising mineral hydrocarbon oil having incorporated therein corrosion inhibiting properties of ethylene cyanide. No. 2,139,086. Arthur Walther Lewis, Elizabeth, N. J., to Tide Water Associated Oil Co., Bayonne, N. J.

Lubricating oil for bearings having incorporated therein corrosion inhibiting properties of cyano acetamide. No. 2,139,087. Arthur Walther Lewis, Elizabeth, N. J., to Tide Water Associated Oil Co., Bayonne, N. J.

Lubricating oil having incorporated therein methylene amino aceto nitrile. No. 2,139,088. Arthur Walther Lewis, Elizabeth, N. J., to Tide Water Associated Oil Co., Bayonne, N. J.

Ribbon ink composed of a pigment tricresyl phosphate, a basic color base, and oleic acid. No. 2,139,092. Samuel A. Neidich, Burlington, N. J., to Underwood Elliott Fisher Co., New York City.

Composition for destroying coccida oocysts comprising sulfur dioxide dissolved in an oil. No. 2,139,102. Karl T. Steik and Julius F. Muller, Upper Montclair, N. J., to National Oil Products Co., Harrison, N. J.

Driers suitable for paint or varnishes and processes for making them. No. 2,139,134. Leo Roon, New York City, to Nuodex Products Co., Newark, N. J.

Polishing compositions for leather, lacquered surfaces and other materials; compositions being of waxy character and containing a monobasic carboxylic acid ester of a perhydrogenated novolak. No. 2,139,231. Winfrid Hentrich, Dusseldorf-Reisholz, and Carl Albert Lainau, Dusseldorf, Germany, to Henkel & Cie, G. m. b. H., Dusseldorf-Holthausen, Germany.

Intaglio printing ink; solution of gilsonite in a liquid component containing petroleum naphtha and a ketone, the two latter products being more volatile than benzol. No. 2,139,242. Walter W. Mock, Rutherford, N. J., to Interchemical Corp., New York City.

Emulsifiable anhydrous parasiticidal composition composed of lauryl thiocyanate and cyclohexyl diethyl ammonium lauryl sulfate. No. 2,139,256. Euclid W. Bousquet to du Pont, both of Wilmington, Del.

Self-emulsifying composition comprising a petroleum wax having dissolved therein an N-dialkyl cyclohexylamine salt of octadecyl sulfate and cetyl alcohol. No. 2,139,276. Samuel Lenher and Luther B. Arnold, Jr., to du Pont, all of Wilmington, Del.

Preparation cyclohexylamine salts of higher alkyl sulfates. No. 2,139,277. Samuel Lenher and Luther B. Arnold, Jr., to du Pont, all of Wilmington, Del.

Improved lubricating oil. No. 2,139,335. Bernard H. Shoemaker, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Horticultural insecticide made from a finely ground tobacco powder, a petroleum sulfonic salt and a small amount of free acid. No. 2,139,340. Wm. Hunter Volck, Watsonville, Calif., to California Spray Chemical Corp., Berkeley, Calif.

Preparation paint or varnish solutions comprising chlorinated rubber, or the halogen addition products, polymers or oxides of rubber dissolved in suitable solvents. No. 2,139,368. John H. Kelly, Jr., Chicago, Ill., to Monsanto Chemical Co., St. Louis, Mo.

Flux for use in arc welding including an alloy of magnesium associated with nickel and a carbonaceous substance. No. 2,139,522. Thos. C. R. Shepherd, Hale Barns, England, to General Electric Co., corp. of New York.

Manufacture plated cup-shaped article; electrodepositing a coating on a metal strip, covering same with a cellulose derivative lacquer to protect the plating and provide lubrication during subsequent forming operations. No. 2,140,131. Murray D. Helfrick, No. Riverside, Ill., to Western Electric Co., New York City.

Acoustical and fibre resistant composition fibre insulating board. No. 2,140,195. Clements Batcheller, Portsmouth, N. H.

Synthetic marble sheet, using a plastic mixture containing hydraulic cement in process. No. 2,140,197. Clements Batcheller, Glens Falls, N. Y.

Manufacture cutting oil compounds. No. 2,140,215. John E. Wilkey, Lyndhurst, O., to Sea Gull Lubricants, Inc., Cleveland, O.

Method purifying petroleum mahogany sulfonates. No. 2,140,263. Geo. Andreas Kessler and Manuel Blumer, Butler, Pa., to L. Sonneborn Sons, corp. of Del.

Production synthetic drying oils from castor oil. No. 2,140,271. Alexander Schwarcman to Spencer Kellogg & Sons, Inc., both of Buffalo, N. Y.

Insecticide containing as its essential, active ingredient, a pentaerythritol derivative in which the hydroxyl groups are replaced by halogen atoms of the group of chlorine, bromine, and iodine. No. 2,140,481. Wm. Gordon Rose, College Park, Md., and Herbert L. J. Haller, Washington, D. C., dedicated to free use of the People in the territory of the U. S.

Stencil comprising a generally ink-pervious, homogeneous, semi-plastic, flexible, non-fibrous, cellulosic sheet containing local areas indented to form offset portions having minute perforations through which ink may pass. No. 2,140,483. August E. Schutte, Northboro, Mass., to A. B. Dick Co., Chicago, Ill.

Formation vulcanized rubber and shellac composition; mixing together shellac, a low temperature, non-alkaline accelerator, and a vulcanizable rubber composition, then vulcanizing mixture. No. 2,140,527. Chas R. Haynes, Clinton, Conn., Weaver R. Clayton, New York City, and Robt. V. Townsend, Arlington, N. J., to Wm. Zinsser & Co., New York City.

Solder comprising copper, silver, nickel, and cadmium. No. 2,140,531. Richard B. Kennedy, Dayton, O.

Production paths, road surfaces, etc., from mixture of a granulated non-powdery, hard, non-water-soluble mineral, a siccative oil, and a drier. No. 2,140,634. Dezso Komlos, Golders Green, London, England.

Manufacture articles of ceramic bonded granular material. No. 2,140,650. Chas. H. Quick, Worcester, Mass., and Milton F. Beecher, Holden, Mass., to Norton Co., Worcester, Mass.

Preparation smooth varnish which is flexible when dry and capable of resisting a high temperature without losing its elasticity. No. 2,140,657. Mortimer L. Strauss, Cleveland Heights, O.

Method forming a sealed connection between two structural members, applying artificial hydrocarbon-resistant rubber cement of low viscosity to each member. No. 2,140,672. Reid B. Gray, Dundalk, and Harry M. Shealey, Balto., Md., to Glenn L. Martin Co., Balto., Md.

Treatment furs by immersion in a colloidal emulsion of wax containing phthalic acid and formaldehyde in uncombined form. No. 2,140,759. Oscar F. Muller, Glen Ridge, N. J., to Dri-Wear, Inc., New York City.

Dielectric composition composed of a liquid chloro-olefine compound containing at least 3 carbon atoms and in which all of the hydrogen has been replaced by chlorine. No. 2,140,784. Edgar C. Britton, Gerald H. Coleman, and Luther F. Berhenke to Dow Chemical Co., all of Midland, Mich.

Heel made from artificial wood composition comprising glue, water, sulfonated castor oil, oxalic acid, and paraformaldehyde, this viscous mixture being combined with finely divided sawdust. No. 2,140,819. Harold F. Stose to Vulcan Corp., both of Portsmouth, O.

Manufacture timber preservative; mixing solution of a zinc salt and a solution of a fluoride with a solution of dinitrophenol, to effect conversion of the soluble fluoride into zinc fluoride. No. 2,140,878. Rebecca Lurie, Johannesburg, So. Africa.

Intensive arc carbon anode comprising a shell of commercially pure carbon and a core which consists of carbon and a material from the group of free metals having atomic numbers between 23 and 28 inclusive, and mixtures of such free metals with insoluble compounds of the rare earth metals. No. 2,140,881. Jean Parisot to Compagnie Lorraine de Charbons pour l'Electricite, both of Paris, France.

Production and application of wetting, cleaning, bleaching, foaming, and dispersive agents for textile purposes, etc. No. 2,140,882. Meindert Danius Rosenbroek, Delden, Twente, Overijssel, Netherlands, one-half to Naamlooze, Vennootschap Chemische Fabriek Servo, Delden, Netherlands.

Impregnation wood and articles made therefrom with a resinous compound of the phenol-formaldehyde type. No. 2,140,981. Philip C. P. Booty and Raymond G. Booty, Chicago, Ill.

Larvacide emulsion, characterized by its quick breaking tendency upon application to the surface of an object, comprising water gas tar, gas oil, dispersed in an aqueous medium wherein a soap is the emulsifying agent. No. 2,141,087. Walter D. Martin, Albany, Ga.

Extreme pressure lubricant comprising a mineral lubricating oil and product obtained by reaction of sulfur monochloride with an aliphatic nitrile. No. 2,141,142. Anderson W. Ralston to Armour & Co., both of Chicago, Ill.

Lubricating composition comprising less than 5% and at least 0.10% by weight of a naphthene sulfonic acid salt of a heavy metal, which salt is dissolved in mineral lubricating oil. No. 20,957. Reissue. Chester Tietig, Covington, Ky.

Manufacture transparent films and sheets by forming film from a synthetic linear condensation polyamide having an intrinsic viscosity above 0.4 in a solution containing hydrogen chloride, and removing solvent from film. No. 2,141,169. Willard E. Catlin to du Pont, both of Wilmington, Del.

Bleaching and cleansing compositions composed of a per compound capable of liberating oxygen when in aqueous solution, a water soluble salt of a phosphoric acid, a water soluble alkaline detergent, and a

U. S. Chemical Patents

Off. Gaz.—Vol. 497, Nos. 1, 2, 3, 4—p. 78

preformed, difficultly soluble, colorless metal silicate. No. 2,141,189. Otto Lind, Dusseldorf, Germany, to Henkel & Cie, G. m. b. H., Dusseldorf-Holthausen, Germany.

Film- and drier-color-stable varnish composition, comprising reaction product of a phenolic-acetaldehyde-oxalic acid resin and drying oil, formed at 90-150° C. in presence of oxalic acid. No. 2,141,197. John B. Rust, Orange, N. J., to Ellis-Foster Co., corp. of N. J.

Aqueous asphalt emulsion containing asphalt and caustic soda, said asphalt composed of a blend of propane precipitated asphalt obtained from a reduced asphalt-containing petroleum crude oil. No. 2,141,230. Wm. J. Sweeney and Kenneth C. Laughlin, Baton Rouge, La., to Standard Oil Development Co., corp. of Del.

Wetting composition composed of a sulfonated higher fatty alcohol of 12-18 carbon atoms and ethyl alcohol. No. 2,141,245. Josef Hirschberger, So. Orange, N. J.

Preparation lubricating oil stocks from mixed base crude petroleum oils by distilling said oils under non-cracking conditions to obtain a viscous heavy residue. No. 2,141,257. Ernest W. Thiele and Bernard Ginsberg to Standard Oil Co., all of Chicago, Ill.

Composition having glue characteristics for joining wood plies with application of pressure and heat, comprising water, comminuted unconverted starch, a partially condensed mixture of an aldehyde resistant to dissipation, and a substance adapted to be condensed therewith. No. 2,141,313. Geo. H. Osgood and Russell G. Peterson, Tacoma, Wash., Peterson assignor to Osgood.

Arc welding flux containing siliceous clay and manganese dioxide. No. 2,141,316. Arnold Mitchell Roberts, Flixton, England, to General Electric Co., corp. of New York.

Method increasing plasticity of a cement concrete mix; increasing number of discrete particles available for hydration by dispersing the individual cement particles throughout aqueous mass by addition of a cement dispersing agent. No. 2,141,569. Geo. R. Tucker, No. Andover, Mass.; Chas. W. Tucker, administrator of said Tucker, deceased, assignor to Dewey & Almy Chemical Co., Cambridge, Mass.

Readily soluble laundry souring and bluing composition in dry, dustless, screened, powdered form, containing comminuted crystalline ammonium silico fluoride and sodium silico fluoride, the crystalline components being coated with a bluing agent. No. 2,141,589. Howard B. Bishop, Summit, N. J.

Manufacture synthetic lubricating oil of high viscosity index and other desirable properties. No. 2,141,593. Louis A. Clarke, and Chas. C. Towne, Poughkeepsie, N. Y., to Texas Co., New York City.

Cement comprising a heat hardenable mixture of finely divided inert material and a liquid resinous vehicle. No. 2,141,637. Albert L. Ball, Lewiston, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Method chromizing; heating object at temperature of approximately 1200° C. to 1400° C. in a reducing atmosphere, in contact with a charge comprising chromium carbide and chromium oxide. No. 2,141,640. Hugh S. Cooper, Cleveland Heights, O., to Cooper Products, Inc., Cleveland, O.

Method laying wood flooring; using batch of adhesive composed of a colloidal dispersion of rubber latex and a protective agent. No. 2,141,708. Armin Elmendorf, Winnetka, Ill.

Production polishing composition from gum tragacanth, water, alkali metal of a sulfated alcohol having more than 8 carbon atoms, glycerin, diatomaceous earth, neutral oil, amyl acetate, formaldehyde. No. 2,141,-729. Theo. R. Thompson, Flint, Mich., to du Pont, Wilmington, Del.

Zinc alloy engraving plate having a high hardness and superior resistance to deformation and wear. No. 2,141,813. Wm. H. Finkeldey, Hastings-on-Hudson, N. Y., to Edes Mfg. Co., Plymouth, Mass.

Liquid composition for removing soot from oil burning furnaces, comprising a fuel oil and an oil-soluble metallic derivative of a petroleum acid. No. 2,141,848. Elmer Wade Adams, Hammond, Frank K. Ovitz, Whiting, and Edwin G. Wiley, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Preparation a fluorescent material comprising heat-treated magnesium oxide, silica, and an exciter. No. 2,141,905. Gorton R. Fonda, and Ralph P. Johnson, Schenectady, N. Y., to General Electric Co., corp. of New York.

Lacquer enamel made by incorporating into an enamel a solvent mixture and non-volatile ingredients including pigment, nitrostarch and an oil-acid modified alkyd resin. No. 2,141,911. Richard Karl Hazen, Montclair, N. J., to Egyptian Lacquer Mfg. Co., corp. of N. J.

Arc welding flux composed of iron oxide, feldspar, talc, sodium carbonate (anhydrous form). No. 2,141,928. March Rudolph Moritz, Sale Moor, and Ian Claude Fitch, Forest Hill, London, England, to General Electric Co., corp. of N. Y.

Flux for arc welding composed of cryolite, feldspar, talc, calcium carbonate. No. 2,141,929. March Rudolph Moritz, Sale Moor, England, to General Electric Co., corp. of N. Y.

Flux for use in arc welding having following composition: manganese dioxide, feldspar, ilmenite, ferro-manganese, kaolin, ferro-titanium. No. 2,141,938. Thos. C. R. Shepherd, Stretford, England, to General Electric Co., corp. of N. Y.

Normally removable and reusable adhesive sheet material comprising base sheet having a normally tacky and pressure sensitive coating comprising cohesive agent, adhesive agent, a non-volatile plasticizer, and a modifier. No. 2,142,039. Allen Abrams and Geo. W. Forcey, Wausau Wis., to Marathon Paper Mills, Rothschild, Wis.

Method removing without danger of explosion residual solvent from materials dry cleaned with an inflammable hydrocarbon solvent of known flash point. No. 2,142,042. Geo. E. Bowdoin, New York City, and Wm. Strobridge, Syracuse, N. Y., to United States Hoffman Machinery Corp., New York City.

Flux coated welding rod. No. 2,142,045. Cecil G. Chadwick, West New York, N. J., to Oxweld Acetylene Co., corp. of W. Va.

Coal Tar Chemicals

Production dioxazine sulfonic acids. No. 2,139,119. Heinrich Greune and Ernst Sturme, Frankfort-am-Main-Hochst, and Martin Reuter, Frankfort-am-Main-Unterliederbach, Germany, to General Aniline Works, New York City.

Adhesive coated metallic film. No. 2,138,854. Wm. Frederick Grupe, Lyndhurst, N. J., to Peerless Roll Leaf Co., Union City, N. J.

Pigmented coating composition, a dry film of which remains free from chalking and bronzing under prolonged exposure to atmospheric conditions. No. 2,139,008. Geo. R. Ensminger, New Brunswick, N. J., to du Pont, Wilmington, Del.

Method treating hemp rope with a wax coating having the normal lubricating properties of wax. No. 2,139,343. Robt. C. Williams and Hugh M. Bone to Ironsides Co., all of Columbus, O.

Solid carbonaceous fuel, consisting of coal body covered with a uniform coating of titanium dioxide rendered tightly adherent through agency af casein; said coating being effective to reduce material atmospheric deterioration of the coal, and to possess several added advantages. No. 2,139,398. Samuel W. Allen, Hudson, O.

Method simultaneously washing and coating coal. No. 2,138,825. Samuel W. Allen, Hudson, O.

Manufacture 4-amino-azo-benzene-4-sulfonic acid. No. 2,139,325. Chas. B. Biswell and Walter V. Wirth, Woodstown, N. J., to du Pont, Wilmington, Del.

Production cresols and higher phenols by fusion. No. 2,139,372. Jos. R. Mares to Monsanto Chemical Co., both of St. Louis, Mo.

Production metal azomethine compounds. No. 2,139,471. Karl Schmidt, Cologne-Mulheim, Germany, to General Aniline Works, New York City.

Production 2,2′-dimethyl-4,4′-dihydroxy-para-phenanthrolin, which forms a crystalline white powder. No. 2,140,318. Hans Henecka, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., New York City.

Alkylation of phenols. No. 2,140,782. James B. Arnold and Ralph P. Perkins to Dow Chemical Co., all of Midland, Mich.

Production hydroxy-alkyl ethers of phenyl phenols. No. 2,140,824. Clarence C. Vernon to University of Louisville, both of Louisville, Ky.

Production N-substituted para-amino-benzaldehydes. No. 2,141,090. Werner Muller, Cologne, and Carl Berres, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York City.

Preparation acryloxy carboxylic acids and their esters. No. 2,141,546. Daniel E. Strain to du Pont, both of Wilmington, Del.

Product hydroxyphenylamino-anthracene. No. 2,141,687. Ernst Dur to Society of Chemical Industrie in Basle, both of Basel, Switzerland.

Production water soluble polyhydroxy-alkyl amino aromatic sulfonamides, the polyhydroxy-alkyl radical containing a cyclic ether linkage and corresponding to the residue of an aldose having an abnormal ether linkage. No. 2,141,843. Fritz Meyer, Grymes Hill, Staten Island, and Eva Schreiber, nee Stege, Great Kills, S. I., N. Y.

Preparation compounds of the pyrazolanthrone series; 1,9-pyrazolanthrone containing in the 6 position a group of the class consisting of —COOH and —COCl. No. 2,141,872. Ralph N. Lulek, Milwaukee, and Earl E. Beard, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Production compounds of the benzanthraquinone series. No. 2,141,877. Wm. L. Rintelman, Carrollville, Wis., to du Pont, Wilmington, Del.

Preparation trifluoromethyl-aryl-sulfonic acids. No. 2,141,893. Arthur Zitscher, Kronberg-in-Taunus, and Hans Kehlen, Offenbach-on-Main, Germany, to General Aniline Works, New York City.

Preparation esters of salicylic acid with phenols. No. 2,141,985. Walter Edw. Huggett, Ilford, England.

Coatings

Transparent film having moistureproof coating. No. 2,140,089. Martin Marasco, Parlin, N. J., to du Pont Film Mfg. Corp., New York City.

Production lead glazes; first fine-grinding metallic lead under admission of air thereby producing a mixture consisting only of the lead in various degrees of oxidation within the range from metallic lead to lead superoxide. No. 2,140,381. Hermann Harkort, Berlin-Tegel, Germany, to Hans-Joachim Harkort, Zurich, Switzerland.

Flotation coating process for fabrics; supporting insoluble metallic pigments on an aqueous body through medium of a film consisting of a volatile liquid which will wet the pigments and make them water-repellent, and causing fabric to contact with and pick up the pigment. No. 2,140,498. John F. Dreyer to Formica Insulation Co., both of Cincinnati, O.

Production vinyl resin surface coatings. No. 2,140,518. Arthur K. Doolittle, So. Charleston, W. Va., to Union Carbide & Carbon Corp., corp. of New York.

Flexible, grease and moisture-resistant sheet suitable for wrapping, etc., comprising a glassine sheet having firmly adhered thereto a thin grease and moisture resistant coating, composed of a rubber hydrochloride having intimately admixed therewith a chlorinated paraffin wax. No. 2,140,835. Erich Gebauer-Fuelnegg, Evanston, Ill., and Eugene W. Moffett, Gary, Ind., to Marbo Patents, Inc., corp. of Del.

Production vinyl resin surface coatings. No. 2,141,126. Arthur K. Doolittle, So. Charleston, W. Va., to Union Carbide & Carbon Corp., corp. of New York.

Protective coatings for zinc-bases. Nos. 2,141,024 and 26. Wm. E. Hall, Hillside, N. J., to Egyptian Lacquer Mfg. Co., corp. of N. J.

Dyes, Stains, etc.

Production azo dyestuffs. No. 2,138,991. Carl I. Anderson, Buffalo, and Ralph B. Payne, Elma, N. Y., to National Aniline & Chemical Co., New York City.

Production amino-acid derivatives. No. 2,139,190. Martin Iselin, Riehen, near Basel, and Jakob Bindler, Basel, Switzerland, to J. R. Geigy & S. A., Basel, Switzerland.

Production azo dyestuffs. No. 2,139,472. Friedrich Schubert, Leverkusen, Germany, to General Aniline Works, New York City.

Color lake possessing good fastness to light, comprising dyestuff of the methine series containing an indoline radical in the molecule. No. 2,140,248. Walther Retter, Cologne-Deutz, Ottmar Wahl, Leverkusen-I. G. Werk, and Werner Muller, Cologne, Germany, to General Aniline Works, New York City.

Preparation water soluble monoazo dyestuffs. No. 2,140,312. Detlef Delfs, Leverkusen-I. G. Werk, Germany, to General Aniline Works, New York City.

Preparation dyestuffs of the dibenzanthrone series. No. 2,140,455. Edw. T. Howell, Milwaukee, Wis., to du Pont, Wilmington, Del.

Production an aromatic azo derivative of 2-amino-3-cyanobarbituric acid. No. 2,140,536. Jas. G. McNally and Jos. B. Dickey, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Production azo compounds and process for coloring therewith. No. 2,140,537. Jas. G. McNally and Jos. B. Dickey, Rochester, N. Y., to Eastman Kodak Co., all of Rochester, N. Y.

Process coloring organic derivatives of cellulose. No. 2,140,538. Jas. G. McNally and Jos. B. Dickey to Eastman Kodak Co., all of Rochester, N. Y.

Azo compounds and process for coloring therewith. No. 2,140,539. Jas. G. McNally and Jos. B. Dickey to Eastman Kodak Co., all of Rochester, N. Y.

Production green orthohydroxy azo dyes. No. 2,140,763. Max Raeck, Dessau-Haideburg, in Anhalt, and Werner Keller, Dessau in Anhalt, Germany, to General Aniline Works, New York City.

Light sensitive multi-layer photographic material for use in production of colored photographic records. No. 2,140,847. Humphrey Desmond Murray and Douglas Arthur Spencer, London, England, to Ilford, Ltd., Ilford, England, and the Veracol Film Syndicate, Ltd., London, England.

U. S. Chemical Patents

Off. Gaz.—Vol. 497, Nos. 1, 2, 3, 4—p. 79

Production vat dyestuff which dissolves in concentrated sulfuric acid with a greenish blue color and dyes cotton from a brown vat very fast yellowish olive shades. No. 2,140,873. Ernst Honold, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, New York City.

Production azo dyes, capable of dyeing animal and vegetable fibers violet red shades of good fastness to washing. No. 2,140,944. Erik Schirm, Dessau/Anhalt, Germany, to General Aniline Works, New York City.

Production azo compounds. No. 2,140,987. Jos. B. Dickey to Eastman Kodak Co., both of Rochester, N. Y.

Production sulfurous dyestuffs. No. 2,141,177. Ernst Dur to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Preparation dye by condensing in presence of a basic condensing agent, one molecular proportion of a 4-cyanoquinoline alkyl quaternary salt with one molecular proportion of a cyclammonium alkyl quaternary salt containing a reactive alkyl group in a reactive position. No. 2,141,434. Frances Mary Hamer and Nellie Ivy Fisher, Harrow, England, to Eastman Kodak Co., Jersey City, N. J.

Production water insoluble azo dyestuffs. No. 2,141,667. Pierre Petitcolas, Rouen, France, to Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies, Etablissements Kuhlmann, Paris, France.

Production vat dyestuffs of the triazoloanthraquinone series. No. 2,141,707. Friedrich Ebel, Mannheim, Germany, to General Aniline Works, New York City.

Production vat dyestuffs of the anthraquinone series. No. 2,141,858. Donald P. Graham, So. Milwaukee, Wis., to du Pont, Wilmington, Del.

Explosives

Explosive composition comprising an alpha-alkyl glycerol trinitrate. No. 2,139,364. Herbert P. A. Groll, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Process for controlling reaction temperature in nitration of organic compounds to produce an explosive, maintaining the reaction mixture in direct heat exchange relationship with a single liquid cooling medium. No. 2,140,345. Philip G. Wrightsman, Chester, Pa., to du Pont, Wilmington, Del.

Explosive composition including dynamite, comprising an explosive compound and a filler of alkali metal silicate bubbles. No. 2,140,447. Jos. W. Ayers to C. K. Williams & Co., both of Easton, Pa.

Method transferring liquid explosive nitric esters; forming an aqueous emulsion with explosive and forcing same with air through a conduit to cause turbulence. No. 2,140,897. Wm. Arthur Percival Challenor, Ardrossan, and Gordon Aldridge Scott, West Kilbride, Scotland, to Imperial Chemical Industries, corp. of Great Britain.

Fine Chemicals

Production sulfonamide compounds. No. 2,138,934. Wm. Henry Moss, London, England, to Celanese Corp. of America, corp. of Del.

Improved process for preparation hydroxy aromatic sulfides; bringing a phenol free from carboxyl groups and a halide of a non-metallic element of Group VI into reaction in an inert solvent. No. 2,139,321. Louis A. Mikeska, Westfield, and Eugene Lieber, Linden, N. J., to Standard Oil Development Co., corp. of Del.

Preparation solution of silver picrate; reacting upon silver oxide with picric acid in presence of a lower monoalkyl ether of diethylene glycol. No. 2,139,400. John C. Bird, Montclair, N. J., to John Wyeth & Bro., Phila., Pa.

A color-forming photographic developer comprising an aromatic amino photographic developing agent and a diacylacetaminoaryl-bisazole. No. 2,140,540. Edmund B. Middleton and Andrew B. Jennings, New Brunswick, N. J., to du Pont Film Mfg. Corp., corp. of Del.

Photographic stripping film. No. 2,140,648. Gale F. Nadeau, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Preparation camphor for use in photographic film. No. 2,140,872. Lee Cone Holt, Wilmington, Del., and Gastao Etzel, Pitman, N. J., to du Pont, Wilmington, Del.

Production molecular compounds; causing an acid from the group of ascorbic and iso-ascorbic acids to react with a base selected from the group of quinine and quinidine. No. 2,140,989. Josef Eisenbrand and Max Sienz, Frankfort-am-Main, Germany, to Winthrop Chemical Co., New York City.

Method bleaching photographic images by treatment with a solution of potassium iodide, then with solution containing iodine and potassium iodide. No. 2,141,354. Alan M. Gundelfinger to Cinecolor, Inc., both of Los Angeles, Calif.

Industrial Chemicals

Method breaking down and utilizing constituents of polyhalite. No. 2,138,827. Reginald K. Bailey, Lawrence, Kans.

Manufacture vitrified granules; first dry grinding a blend of selected clays having selected color characteristics, and adding water mixed with phosphoric acid to produce a plastic mass. No. 2,138,870. Donald E. Lower, Aspers, Pa.

Composition comprising a rubber stock and a polymerized aliphatic isoolefin having an average molecular weight of above 800 as determined by the viscosity method. No. 2,138,895. Peter J. Wiezevich, Elizabeth, N. J., now by judicial change of name Peter J. Gaylor, to Standard Oil Development Co., corp. of Del.

Preparation hydroxylamine derivatives of cyclic compounds. No. 2,138,899. Henry H. Bassford, Jr., Naugatuck, Conn., to U. S. Rubber Products, Inc., New York City.

Method oxidizing a higher molecular olefine-1, having 8 or more carbon atoms in the molecule, into a higher molecular glycol 1, 2, while the former is in solution in a low aliphatic acid with the aid of heat, for period necessary to complete glycol formation, and saponifying to produce free glycol. No. 2,138,917. Adolf Grun, Basel, Switzerland, to American Hyalsol Corp., Wilmington, Del.

Production a leaded zinc oxide having improved pigment properties; calcining mixture of a leaded zinc oxide and an inorganic phosphatic substance in a furnace having a non-siliceous refractory lining. No. 2,139,013. Worthington T. Grace, Willoughby, and Albert H. Ristau, Cleveland, O., to du Pont, Wilmington, Del.

Method preparing catalyst. No. 2,139,026. Geo. L. Matheson, Union, N. J., to Standard Oil Development Co., corp. of Del.

Preparation sulfuric acid derivatives of organic acid amides. No. 2,139,037. Erich Rosenhauer, Dusseldorf-Benrath, Germany, to Henkel & Cie, G. m. b. H., Dusseldorf, Germany.

Conversion spent battery plate powders into pure litharge and sodium sulfate. No. 2,139,069. Robert M. Cole, Bryn Athyn, Pa.

Production butyl alcohol, acetone, and ethyl alcohol; subjecting a molasses mash to action of Clostridium saccharo-butyl-acetonicum-liquefaciens, and supplying ammonium hydroxide to the fermenting mash. No. 2,139,108. Cornelius F. Arzberger to Commercial Solvents Corp., both of Terre Haute, Ind.

Production butyl alcohol, acetone, and ethyl alcohol; subjecting mash containing sucrose and an ammonium compound to action of bacteria of the group of Clostridium saccharo-butyl-acetonicum-liquefaciens-gamma and Clostridium saccharo-butyl-acetonium-liquefaciens-delta. No. 2,139,111. Edwin H. Carnarius and Winifred N. McCutchan, Peoria, Ill., to Commercial Solvents Corp., Terre Haute, Ind.

Production nitrohydroxy compounds by reaction of nitroparaffins and aldehydes; effecting reaction in presence of a catalyst comprising a hydroxide of an alkaline earth metal. No. 2,139,120. Henry B. Hass, West Lafayette, and Byron M. Vanderbilt, Terre Haute, Ind., to Purdue Research Foundation, La Fayette, Ind.

Production aliphatic nitroalcohols. No. 2,139,121. Henry B. Hass, West Lafayette, and Byron M. Vanderbilt, Terre Haute, Ind., to Purdue Research Foundation, La Fayette, Ind.

Production aminoalcohols. No. 2,139,122. Henry B. Hass, West Lafayette, and Byron M. Vanderbilt, Terre Haute, Ind., to Purdue Research Foundation, La Fayette, Ind.

Production 2-amino-1-pentanol. No. 2,139,123. Henry B. Hass, West Lafayette, and Byron M. Vanderbilt, Terre Haute, Ind., to Purdue Research Foundation, La Fayette, Ind.

Production aminoalcohols. No. 2,139,124. Henry B. Hass, West Lafayette, and Byron M. Vanderbilt, Terre Haute, Ind., to Purdue Research Foundation, La Fayette, Ind.

Removal nitrous acid from a nitrous acid-containing, aqueous sodium nitrate solution; by addition of an aqueous ammonia solution containing urea to the nitrate solution while it contains free nitric acid. No. 2,139,142. Chas. Fitch Weston, Prince George County, Va., to Solvay Process Co., New York City.

Production tetrachlorethylene from 1, 1, 2, 2-tetrachlorethane. No. 2,139,219. Georg Basel and Erich Schaeffer, Burghausen, Obb., Germany, to Dr. Alex. Wacker, Gesellschaft fur Elektrochemische Industrie, G. m. b. H., Munich, Germany.

Removal SO_2 from gases. No. 2,139,375. Russell W. Millar and Herbert P. A. Groll, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Hydrolysis of fats and oils. No. 2,139,589. Martin Hill Ittner, Jersey City, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J.

Recovery maleic anhydride from mixture containing maleic anhydride and water vapors. No. 2,140,140. Elton B. Punnett, Buffalo, N. Y., to National Aniline & Chemical Co., New York City.

Manufacture an elastic, porous, and compressible product; incorporating into an ammoniacal rubber latex a dry powdered mixture of rosin, bentonite, and a difficultly water-soluble salt of a metal, the resinate of which is water-insoluble. No. 2,140,265. Martin Leatherman, Hyattsville, Md., dedicated to free use of the Public in the territory of the U. S.

Preparation urea derivatives. No. 2,140,272. Winfield Scott, Akron, O., to Wingfoot Corp., Wilmington, Del.

Manufacture fiber comprising casein and salts of casein and fat acids. No. 2,140,274. Earle O. Whittier and Stephen P. Gould, Washington, D. C., to free use of the People of the U. S.

Process extracting sugar from molasses by dialysis; passing molasses and water countercurrently on opposite sides and in contact with a non-fibrous cellulose hydrate membrane, molasses being maintained under a greater pressure than the water. No. 2,140,341. Roger N. Wallach, Briarcliff Manor, and Justin Zender, Irvington, N. Y., Wallach assignor to Sylvania Industrial Corp., Fredericksburg, Va., and Zender assignor to Stauffer Chemical Co., New York City.

Process stabilizing crude carbohydrate derivative, introducing a saturated carbohydrate derivative into anhydrous, liquid ammonia. No. 2,140,346. Rudolph S. Bley, Elizabethton, Tenn., to North American Rayon Corp., New York City

Production finely divided calcium carbonate having a particle size under one micron, and which does not agglomerate. No. 2,140,375. Edw. M. Allen, Barberton, and Geo. M. Lynn, deceased, late of Wadsworth, O., by Ethel P. Lynn, administratrix, Wadsworth, O., assignors to Pittsburgh Plate Glass Co., corp. of Pa.

Preparation catalyst by wet reduction. No. 2,140,400. Seymour Faulkner to Procter & Gamble, Co., both of Cincinnati, O.

Production methacrylyl containing compounds; treating acetone cyanhydrin with at least one molecular proportion of sulfuric acid and isolating methacrylamide from resulting solution. No. 2,140,469. John Wm. Croom Crawford and James McGrath, Ardrossan, Scotland, to Imperial Chemical Industries, corp. of Great Britain.

Preparation bis (2, 3-hydroxy-naphthoyl-M-aminophenyl) urea. No. 2,140,495. Samuel Coffey, Manchester, and John Edgar Schofield, Huddersfield, England, to Imperial Chemical Industries, Corp. of Great Britain.

Preparation ethyl chloride; passing ethyl ether and hydrogen chloride into contact with a bath of molten metal chlorides. No. 2,140,500. James Laurence Amos to Dow Chemical Co., both of Midland, Mich.

Production ethyl chloride by reacting ethylene with hydrogen chloride in presence of a liquid chlorinated aliphatic hydrocarbon containing a catalyst for the reaction. No. 2,140,507. Leonard C. Chamberlain, Jr., Jack L. Williams, and Robt. D. Blue to Dow Chemical Co., all of Midland, Mich.

Continuous process for production of ethyl chloride from ethylene and hydrogen chloride in presence of a hydrohalogenation catalyst carried by a circulating inert liquid medium. No. 2,140,508. Leonard C. Chamberlain, Jr., James L. Amos, and Jack L. Williams to Dow Chemical Co., all of Midland, Mich.

Preparation stable emulsions of tetrachlorethane in water; adding lauryl amine hydrocarbon to tetrachlorethane, then agitating solution with water. No. 2,140,519. Arthur A. Elston, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Synthetic product of high molecular weight prepared by volatization in liquid phase of a mixture of an organic compound having a long hydrocarbon chain and another substance. No. 2,140,545. Mathias Pier, Heidelberg, and Friedrich Christmann, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process chlorinating ethane; subjecting a gaseous mixture containing ethane and chlorine to intimate contact with a liquid mass of metal chlorides. No. 2,140,547. John H. Reilly to Dow Chemical Co., both of Midland, Mich.

Chlorination of ethylene chloride. No. 2,140,548. John H. Reilly to Dow Chemical Co., both of Midland, Mich.

Preparation 1, 1, 2-trichloroethane. No. 2,140,549. John H. Reilly to Dow Chemical Co., both of Midland, Mich.

Chlorination of benzene; reacting chlorine with benzene in contact with molten metal chlorides at temperature between 200 and 400° C. No. 2,140,550. John H. Reilly to Dow Chemical Co., both of Midland, Mich.

U. S. Chemical Patents

Off. Gaz.—Vol. 497, Nos. 1, 2, 3, 4—p. 80

Chlorination of acetylene; reacting chlorine with acetylene in presence of the vapors of a nonflammable chlorinated lower aliphatic hydrocarbon and in contact with molten metal chlorides. No. 2,140,551. John H. Reilly to Dow Chemical Co., both of Midland, Mich.

Production organic sulfur compounds, reacting sulfur compounds, otherwise stable under the reaction conditions obtaining, and having the general formula $R(YCH{=}CH_2)x$. No. 2,140,569. Hanns Ufer and Otto Hecht, Ludwigshafen-am-Rhine, Germany, to I. G. Frankfort-am-Main, Germany.

Production furfural. No. 2,140,572. Harold J. Brownlee, Cedar Rapids, Iowa, to Quaker Oats Co., Chicago, Ill.

Process treating unclarified alkaline cyanide solution containing dissolved pervious metals from which the majority of ore solids have been removed by gravity settling. No. 2,140,591. Louis D. Mills and Thos. B. Crowe, Palo Alto, Calif., to Merrill Co., San Francisco, Calif.

Recovery hydrocyanic acid from gases. No. 2,140,605. Frederick W. Sperr, Jr., Vineland, N. J., to Rohm & Haas Co., Phila., Pa.

Production organic sulfoxides and sulfones. No. 2,140,608. Hanns Ufer, Ludwigshafen-am-Rhine, Germany, to I. G. Frankfort-am-Main, Germany.

Production sulfone-ethylamines; causing acetylene to act on a mixture of sulfonic acid and an amine. No. 2,140,609. Hanns Ufer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production addition products of acetylene and alcohol. No. 2,140,713. Julius A. Nieuwland, Geo. F. Hennion, and Donald B. Killian, Notre Dame, Ind., to du Pont, Wilmington, Del.

Manufacture alkali metal and ammonium nitrates by conversion of alkali metal or ammonium chlorides with nitric acid. No. 2,140,726. Wilhelm Wild and Friedrich Lieseberg, Ludwigshafen-am-Rhine, Germany.

Method improving soya bean oil, particularly with respect to extending its pre-reversion period, using an aliphatic polyhydroxy substance in process. No. 2,140,793. Albert K. Epstein, Harold L. Reynolds, and Myron L. Hartley, Chicago, Ill.; Hartley assignor to Epstein, and Reynolds assignor to Emulsol Corp., Chicago, Ill.

Method improving soya bean oil, particularly with respect to extending its pre-reversion period. No. 2,140,794. Albert K. Epstein and Myron L. Hartley, Chicago, Hartley assignor to Epstein.

Conversion fly ash into a pozzolanic material; mixing an alkali, or a salt of an alkali, with the fly ash, and heating to temperature that will cause sintering, but will not fuse it. No. 2,140,850. Mario Palmieri, Chicago, and Arnold J. Beck, Niles Center, Ill., one-half to Sanitary District of Chicago, Chicago, Ill.

Composition comprising a vulcanized rubber hydrochloride and an ester of benzoyl benzoic acid. No. 2,140,868. Herbert A. Winkelmann to Marbon Corp., both of Chicago, Ill.

Manufacture alumina. No. 2,140,883. Jean Chas. Seailles, Paris, France.

Gravitation concentration of mineral values, especially coal. No. 2,-140,899. Geo. Wm. Davidson, London, England.

Preparation ethyl chloride by reaction of a hydrohalogenation catalyst carried in a circulating inert liquid medium. No. 2,140,927. •James E. Pierce to Dow Chemical Co., both of Midland, Mich.

Preparation 2-hydroxymethyl-1, 3-dioxolane, being characterized as a colorless liquid with a B. P. of 97° C. at a pressure of 30 mm. of mercury, and having a sp. gr. of 1.2026 at 20°/20° C. No. 2,140,938. Raymond W. McNamee, So. Charleston, and Chas. M. Blair, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., corp. of New York.

Process for preventing incrustation on heating surfaces during the concentration of sulfite-cellulose waste liquor. No. 2,140,992. Wilhelm Gensecke, Gonzenheim, near Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Production organic substituted alkali metal amides. No. 2,141,058. Karl Ziegler, Heidelberg, Germany, to Schering A. G., Berlin, Germany.

Treatment aluminous siliceous material containing silica, using an alkali earth metal compound and an alkali metal compound in process. No. 2,141,132. Roy C. Folger, Cleveland Heights, O., to Cowles Detergent Co., corp. of Ohio.

Method converting a sulfite into an oxide and sulfur dioxide. No. 2,141,228. Alamjit D. Singh, Urbana, Ill., to Commonwealth Edison Co., Chicago, Ill.

Recovery carbon disulfide from industrial effluent waters. No. 2,141,-349. Alfred Engelhardt, Gonzenheim, near Bad Homburg vor der Hohe, Germany, to Carbo-Norit-Union Verwaltungs-Gesellschaft m. b. H., Frankfort-am-Main, Germany.

Preparation solutions of cellulose in sulfuric acid. No. 2,141,383. Heinrich Fink and Richard Hofstadt, Wolfen (Kreis Bitterfeld), Germany, to I. G., Frankfort-am-Main, Germany.

Production succinic acid; first reacting an aqueous solution of maleic acid with a metal more electro-positive than hydrogen and less electro-positive than the alkaline earth metals. No. 2,141,406. Ebenezer E. Reid, Balto., Md., to Hercules Powder Co., Wilmington, Del.

Production glycol derivatives; condensation of olefine oxides with a hydroxylated reactant from the group of water, alcohols, and phenols. No. 2,141,443. Herbert Muggleton Stanley, Tadworth, James Ernest Youell, Wallington, and Gregoire Minkoff, Belmont, England.

Preparation colloidal alkaline earth metal carbonates; treating slurry containing a soluble alkaline earth metal salt other than a carbonate or hydroxide and an alkali earth metal hydroxide by simultaneous additions thereto, with agitation, of an alkali metal carbonate and carbon dioxide gas. No. 2,141,458. Walter C. Bates and Raymond R. McClure to Diamond Alkali Co., all of Painesville, O.

Preparation neutral aluminum salts of lower aliphatic acids; heating metallic aluminum with a lower aliphatic acid in presence of an anhydride of a lower aliphatic acid. No. 2,141,477. Josef Losch to Aktiengesellschaft fur Stickstoffdunger, both of Knapsack, near Cologne-am-Rhine, Germany.

Process obtaining starch from corn. No. 2,141,562. Samuel Shurback, No. Kansas City, Mo., to Corn Products Refining Co., New York City.

Process of introducing a side chain into the nucleus of a cyclic compound capable of being alkylated; adding to cyclic compound another compound containing an olefinic double bond and reacting mixture with anhydrous P_2O_5 at temperature between 150 to 300° C. No. 2,141,611. Boris Malishev, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Production extracts from solid carbonizable material by treatment with liquid solvents, the major portion of which consists of tetraline. No. 2,141,615. Alfred Pott, Essen-on-Ruhr, Germany.

Preparation aralkyl ethers of high molecular carbohydrates. No. 2,141,721. Karl Meinel, Dormagen-I. G. Werk, near Cologne, Germany, to Hercules Powder Co., Wilmington, Del.

Manufacture carbon bisulfide. No. 2,141,740. Bernard M. Carter, Montclair, N. J., to General Chemical Co., New York City.

Manufacture carbon bisulfide. Nos. 2,141,757-58. Henry F. Merriam, West Orange, N. J., to General Chemical Co., New York City.

Recovery copper from waste liquors of the artificial silk industry in the form of copper hydroxide. No. 2,141,763. Adolf Richter, Dessau-in-Anhalt, Werner Busch, Leverkusen-I. G. Werk, and Max Otto Schurmann, Dormagen, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture carbon bisulfide. Nos. 2,141,766 and 68. Chas. Forbes Silsby, White Plains, N. Y., to General Chemical Co., New York City.

Preparation tubular articles from freely flowing solutions which are instantly coagulable in a coagulating medium. No. 2,141,776. Leon Pierre Georges Vautier, St.-Just-des-Marais, and Rene Eduoard Fays, Villeurbanne, France, to du Pont, Wilmington, Del.

Improved method of recovering sulfur dioxide contained in tail gas from a sulfite digesting process, and making raw acid of a constant strength so as to eliminate ordinary adjustments in the flow of the burner gas to compensate for the fluctuations in flow of the tail gas. No. 2,141,886. Walter H. Swanson, Neenah, and Donald C. Porter, Appleton, Wis., to Paper Patents Co., Neenah, Wis.

Receptacle for containing glass during its manufacture, comprising an inner shell of aluminous porcelain, an outer casing of mechanically strong refractory clay, and an intervening layer of calcined alumina powder. No. 2,141,930. John Henry Partridge, Middlesex, England, to General Electric Co., corp. of N. Y.

Treatment interior of a gas system by application of a liquid selected from the group of mono methyl ether of ethylene glycol and mono methyl ether of diethylene glycol. No. 2,141,959. John R. Skeen, Phila., Pa., to United Gas Improvement Co., corp. of Pa.

Preparation 2-p-dioxanone; dehydrogenating diethylene glycol by the aid of a metallic dehydrogenating catalyst. No. 2,142,033. Raymond W. McNamee, So. Charleston, and Chas. M. Blair, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York City.

Hydration of olefines; replacing alcohol vapor in a gas under high pressure and at temperature of at least about 175° C. with water vapor. No. 2,142,036. Kenneth H. Rowland and Rolf V. Wallin, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York City.

Leather

Method tanning animal skin; pretanning same with solution of the formula $M_2O.P_2O_5$, in which M is hydrogen, ammonium and/or an alkali-metal, and in which the molar ratio of M_2O to P_2O_5 is less than 2:1. No. 2,140,042. John Arthur Wilson, Milwaukee, Wis., to Hall Labs., Pittsburgh, Pa.

Method tanning animal skin by treatment with a solution containing a compound of the formula $(M_2O)x.(P_2O_5)y$, in which M is hydrogen, ammonium and/or an alkali-metal, and in which the molar ratio of M_2O to P_2O_5 is less than 2:1. No. 2,140,041. John Arthur Wilson, Milwaukee, Wis., to Hall Labs., Pittsburgh, Pa.

Production dehaired hides with the aid of mold tryptases in alkaline solution. No. 2,139,209. Otto Rohm, Darmstadt, Germany.

Production tanning compounds; degrading an albuminous substance in an aqueous medium, evaporating, then combining degradation product with a soluble ferric compound which does not form a precipitate therewith. No. 2,141,276. Herbert Muensch, Mannheim, and Hermann Loewe, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Metals and Alloys

Process smelting metallurgical dusts comprising oxides of lead, tin and zinc. No. 2,139,065. Jesse O. Betterton, Metuchen, and Albert J. Phillips, Plainfield, and Ross E. Allen, Avenel, N. J., to American Smelting & Refining Co., New York City.

Welding wire for carbon electrode arc welding containing carbon, silicon, manganese, sulfur, phosphorus, another metal, and iron. No. 2,140,237. Franz Leitner, Kapfenberg, Steiermark, Austria.

Welding wire for electric arc welding comprising a ferrous electrode containing one metal from the group of aluminum, and titanium, and having a core containing lime and aluminum. No. 2,140,238. Franz Leitner, Kapfenberg, Steiermark, Austria.

Production castings of aluminum alloys made from magnesium, silicon, manganese and aluminum. No. 2,139,246. Paul Spitaler, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Copper alloy made from iron, cobalt, silicon, beryllium and copper. No. 2,139,497. Franz R. Hensel and Earl I. Larsen, to P. R. Mallory & Co., all of Indianapolis, Ind.

Separation precious metals from non-precious metals in metal bearing earth. No. 2,139,498. Ernest Hey, Seattle, Wash., and Franklin H. Hunsicker, Oakland, Calif., 45% to Hey, 10% to Hunsicker, and 45% to Robert Dixon, Oakland, Calif.

Treatment zinciferous materials, such as ores, concentrates, calcines, flue dusts, etc., containing cadmium and lead. No. 2,140,309. Jesse O. Betterton and Wm. H. Bitner, Metuchen, N. J., to American Smelting and Refining Co., New York City.

Electrode comprising a base metal composed of an alloy made from cobalt, nickel and titanium, said metal having a layer of electron-emissive material thereon. No. 2,140,367. Erwin F. Lowry, Wilkinsburg, Pa., to Westinghouse Electric & Mfg. Co., corp. of Pa.

Production rustless iron of good corrosion-resistance, good cold-working properties, and good machining characteristics; being a combination of chromium, nickel, sulfur, carbon, and iron. No. 2,140,501. Wm. Bell Arness to Rustless Iron & Steel Corp., both of Balto., Md.

Production lead-bismuth-lithium cable sheath. No. 2,140,544. Hans Osborg, Bronxville, N. Y., to Maywood Chemical Works, Maywood, N. J.

Treatment materials containing tantalum and/or niobium. Nos. 2,140,-800-1. Jos. Pierre Leemans to Societe Generale Metallurgique de Hoboken, both of Hoboken, near Antwerp, Belgium.

Production magnetic powder. No. 2,140,889. Hans Vogt, Berlin-Steglitz, Germany, to Micro Products Corp., Hastings-on-Hudson, N. Y.

Turbine blade having high strength, high resistance to oxidation, and high ductility and toughness when exposed to superheated steam at high pressures, composed of a steel containing chromium, carbon, nitrogen, and iron. No. 2,140,905. Russell Franks, Niagara Falls, N. Y., to Union Carbide & Carbon Research Labs., corp. of New York.

Alloy steel composed of chromium, nickel, manganese, silicon, molybdenum, and iron. No. 2,141,016. Peter Payson, New York City.

Copper alloy containing copper, zinc, arsenic, phosphorus. No. 2,141,-054. Persak Tookousian assignor of 15% to Harry E. Kouzian, both of Detroit, Mich.

Contact for electrical circuit breaker mechanisms composed of a silver manganese alloy. No. 2,141,113. Chester Peterson, Maplewood, N. J., to H. A. Wilson Co., corp. of N. J.

Contact for electrical circuit breaker mechanisms composed of an alloy of silver, manganese, and a diluent. No. 2,141,114. Chester Peterson, Maplewood, N. J., to H. A. Wilson Co., corp. of N. J.

U. S. Chemical Patents

Alloy consisting of silver, zinc, copper, and another metal. No. 2,141,156. Arthur W. Peterson, No. Attleboro, Mass., to Metals & Controls Corp., Attleboro, Mass.

Gold alloy consisting of gold, copper, cobalt, silver, and zinc. No. 2,141,157. Arthur W. Peterson, No. Attleboro, Mass., to Metals & Controls Corp., Attleboro, Mass.

Composite bearing composition comprising a bearing base consisting of an alloy containing cadmium, silver and tin. No. 2,141,201. Jeno Tausz, Petrolia, Pa., to L. Sonneborn Sons, corp. of Del.

Production an austenitic nickel-chromium alloy-steel suitable in particular as a constructional material for use at elevated temperatures, composed of nickel, chromium, cobalt, titanium, carbon, and iron. No. 2,141,389. Wm. Herbert Hatfield, Sheffield, England, to Thos. Firth & John Brown, Ltd., both of Sheffield, England.

Removal iron from high alumina materials; mixing with a small quantity of the material from 1 to 10 times the amount of carbon necessary to satisfy the equation $Fe_2O_3+3C+3Cl_2=2FeCl_3+3CO$, based on the initial iron content of a total batch of the material to be treated. No. 2,141,444. Martin F. Nordberg to Corning Glass Works, both of Corning, N. Y.

Production boron carbide alloy. No. 2,141,617. Raymond R. Ridgway, Niagara Falls, N. Y., to Norton Co., Worcester, Mass.

Process controlling the slag content and distribution in the manufacture of wrought iron. No. 2,141,671. Edw. B. Story, Library, and Evard P. Best, Edgeworth, Pa., to A. M. Byers Co., Pittsburgh, Pa.

Cored wire for producing a welded joint of high endurance limit strength under repeated stresses composed of carbon, silicon, manganese, zirconium, and iron, the core being composed of lime, aluminum, and manganese. No. 2,141,996. Franz Leitner, Kapfenberg, Austria.

Production ferrovanadium by alumino thermic reaction. No. 2,142,031. Otto H. Lorange, Columbiana, O., to United States Vanadium Corp., corp. of Del.

Naval Stores

Treatment crude oleo-resins prior to their conversion into rosin and turpentine. No. 2,140,511. McGarvey Cline, Jacksonville, Fla.

Treatment crude oleo-resins prior to their treatment to obtain rosin and turpentine. No. 2,140,512. McGarvey Cline, Jacksonville, Fla.

Injection into a mass of crude pine oleo-resin exudates of an alkaline reagent and a liquid medium, in final step of process obtaining an oleo-resinous aggregate containing uncombined resin acids and resinates. No. 2,140,513. McGarvey Cline, Jacksonville, Fla.

Treatment pine oleo-resins and products resulting therefrom. No. 2,140,514. McGarvey Cline, Jacksonville, Fla.

Paper and Pulp

Method making a true solution of sulfate of alumina for paper sizing having a pH of from 3.8 and 4.2; adding to an aqueous solution of commercial sulfate of alumina an aqueous solution of a member of the group of lime, magnesia, soda, the carbonates and acetates thereof. No. 2,138,840. Judson A. De Cew, Mt. Vernon, N. Y.

Marking solution for paper consisting of an aromatic hydrocarbon of the benzene series, a vegetable oil, gum spirits of turpentine, and a solvent. No. 2,140,754. Felix Lauter, Evanston, Ill., to Sealkote Corp., Chicago, Ill.

Manufacture and development of light-sensitive coated paper. No. 2,141,103. Harold J. Brunk and Morris Dickason, Chicago, Ill., to C. F. Pease Co., corp. of Del.

Petroleum

Process for sweetening mercaptan-bearing hydrocarbon oil to sweeten same, using a copper compound in process. No. 20,938. Reissue. Chas. O. Hoover, Houston, Tex., to Bennett-Clark Co., San Antonio, Tex.

Process of lowering pour point of lubricating oil. No. 2,138,868. Leo Liberthson, New York City, to L. Sonneborn Sons, corp. of Del.

Two-stage hydrogenation process. No. 2,138,881. Robt. Pyzel to Universal Oil Products Co., both of Chicago, Ill.

Solvent extraction of olefines and diolefines from petroleum. No. 2,139,000. Chas. A. Cohen, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Production linear polymers of high molecular weight from olefines or mixtures rich in same. No. 2,139,038. Robt. P. Russell, Short Hills, N. J., to Standard Oil Development Co., corp. of Del.

Production unsaturated alcoholic bodies from saturated polyhalides having at least 3 carbon atoms in an aliphatic chain of which two contiguous carbon atoms are halogenated and the contiguous third carbon atom is linked with at least one hydrogen atom. No. 2,139,115. Wm. Engs, Oakland, Henry W. de Jong, Berkeley, and Miroslov W. Tamele, Oakland, Calif., to Shell Development Co., San Francisco, Calif.

Process refining oil to produce as a by-product a composition of asphalt and spent adsorbent. No. 2,139,161. Geo. Howard Hutchins, Hollywood, Calif., and Arthur W. Hartigan, New York City, to Filtrol Co. of Calif., Los Angeles, Calif.

Purification a crude water-immiscible secondary alcohol obtained by hydration of the corresponding olefine. No. 2,139,179. Anton Johan Tulleners, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Solvent refining of mineral oil. No. 2,139,240. Edw. Gardner McFarland to Indian Refining Co., both of Lawrenceville, Ill.

Preparation mixed tertiary butyl ethers of the formula $(CH_3)_3C\text{-}O\text{-}R$ in which -O-R represents a branched chain alkoxy radical wherein R is the alkyl radical of an aliphatic alcohol of the class of the aliphatic secondary and aliphatic iso alcohols containing at least 5 carbon atoms. No. 2,139,359. Theo. Evans, Martinez, and Karl Edlund, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Continuous distillation process for production of an unsaturated ketone from the corresponding keto-alcohol in presence of a dehydrating catalyst, using as reflux medium the stratified unsaturated ketone phase obtained by condensation of the distillate. No. 2,139,360. Alasdair W. Fairbairn and Wm. Engs, Oakland, Calif., to Shell Development Co., San Francisco, Calif.

Process of concentrating the paraffinic component of a high boiling mineral oil. No. 2,139,392. Sijbren Tijmstra, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Production alkyl ester salts from acid liquor produced by absorption of an olefine in a polybasic mineral acid. No. 2,139,393. Adrianus Johannes van Peski and Anton Johan Tulleners, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Preparation acid sulfate of a non-resinous unsaturated polymer of an organic compound which had contained an unsaturated aliphatic radical. No. 2,139,394. Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Sulfuric acid treatment of dewaxed petroleum stocks at low temperature. No. 2,140,161. Edw. John Martin, East Chicago, Ind., to Sinclair Refining Co., New York City.

Process increasing production of a well by disintegrating difficultly soluble deposits of calcium sulfate. No. 2,140,183. Fritz Bresler, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Regenerative process of extracting mercaptans from sour hydrocarbon oils with an aqueous alkali hydroxide solution, thereby forming water-soluble mercaptides. No. 2,140,194. David Louis Yabroff and John Wilkinson Givens, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Process for continuous coking of hydrocarbon oils. No. 2,140,276. Jos. G. Alther to Universal Oil Products Co., both of Chicago, Ill.

Distillation of hydrocarbon oils. No. 2,140,342. John S. Wallis and Chas. T. Chave, New York City, to American Locomotive Co., New York City.

Method distilling hydrocarbon oils. No. 2,140,450. Richard S. Danforth, Berkeley, Calif., to American Locomotive Co., New York City.

Method refining an asphaltic waxy mineral oil, first dissolving oil in dichlorodifluoromethane. No. 2,140,485. Ernest Terres, New York City and Erich Saegebarth, Long Island City, N. Y., and Jos. Moos, Berlin-Mariendorf, and Hans Ramser, Berlin-Steglitz, Germany, to Edelneau Gesellschaft, m. b. H., Berlin, Germany.

Process for desalting a dry emulsion, free mineral oil, passing same upwardly through a stationary bed of rock salt while maintaining said bed dry. No. 2,140,574. Cedric S. Cerf, Holt, Calif.

Anti-knock gasoline comprised of low octane value gasoline, iron pentacarbonyl, and a peptizing agent. No. 2,140,627. John Warner Hocking, Lincoln Park, Mich.

Dehydration of organic oxy compounds. No. 2,140,694. Theo. Evans, Martinez, Calif., to Shell Development Co., San Francisco, Calif.

Method decreasing the viscosity-gravity constant of a petroleum lubricating oil. No. 2,141,085. Eric B. Hjerpe, Pittsburgh, and Wm. A. Gruse, Wilkinsburg, Pa., to Gulf Research & Development Co., Pittsburgh, Pa.

Processes for refining hydrocarbon oils by means of halogen compounds. No. 2,141,143. Ernst Terres, Berlin, Germany, Josef Moos, New York City, and Erich Saegebarth, Jackson Heights, N. Y., to Edelneau Gesellschaft, m. b. H., corp. of Germany.

Reforming a naphtha fraction to improve its anti-knock characteristics. No. 2,141,185. Eugene J. Houdry, Phila., Pa., to Houdry Process Corp., Dover, Del.

Method hydrating olefines. No. 2,141,275. Warren K. Lewis, Newton, Mass., to Standard Oil Development Co., corp. of Del.

Treatment petroleum oil containing residual sulfuric acid obtained from an acid sludge. No. 2,141,297. Paul J. Harrington, Fanwood, N. J., to Standard Oil Development Co., corp. of Del.

Dewaxing process. No. 2,141,361. Stanislaw Pilat and Marian Godlewicz, Lwow, Poland, to Shell Development Co., San Francisco, Calif.

Solvent extraction of mineral lubricating oils. No. 2,141,511. Clifford C. Buchler and Sterling H. Diggs, Casper, Wyo., to Standard Oil Co., Chicago, Ill.

Limpid oil composition for suppressing wax in oils, comprising a mineral oil containing wax and pentastearyl glucose. No. 2,141,601. Chas. Edwin Francis and Bernard Sutro Greensfelder, Martinez, Calif., to Shell Development Co., San Francisco, Calif.

Method refining oil by solvent extraction to separate it into fractions rich in low and high viscosity index constituents, using tetrahydrofurfuryl acetate and halogenated acetic acid in process. No. 2,141,605. Waldersee B. Hendrey and Leon W. Cook, Beacon, N. Y., to Texas Co., New York City.

Simultaneous dewaxing and acid treating of mineral oil which contains an insufficient quantity of sludge forming substance. No. 2,141,622. Horace B. Setzler, Coffeyville, Kans., to National Refining Co., corp. of Ohio.

Method refining paraffin base oils, containing insufficient asphaltic material for satisfactory acid dewaxing treatment, to form wax-free bright stock. No. 2,141,623. Victor I. Downey, Lakewood, O., to National Refining Co., Cleveland, O.

Solvent refining hydrocarbon oil. No. 2,141,626. LeRoy G. Story, White Plains, N. Y., to Texas Co., New York City.

Treatment petroleum oil to produce gasoline and fuel oil. No. 2,142,075. Louis C. Rubin, Nutley, N. J., to Gasoline Products Co., Newark, N. J.

Pigments

Manufacture a pigment intermediate for use in coating compositions. No. 2,138,860. Robt. Tyler Hucks, South River, N. J., to du Pont, Wilmington, Del.

Production litharge from lead and sodium nitrate. No. 2,139,002. Robt. M. Cole, Bryn Athyn, Pa.

Production synthetic iron oxide pigments from iron sulfate. No. 2,139,109. Jos. W. Ayers to C. K. Williams & Co., both of Easton, Pa.

Manufacture zinc oxide of small non-acicular form. No. 2,139,196. Wm. T. Maidens, Columbus, O., to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Manufacture carbon black. Nos. 2,139,584-5. Howard J. Hunter, Fairbanks, La., to Columbian Carbon Co., New York City.

Preparation pigmentary lead titanate. No. 2,140,222. Helmut Espenscheid, Metuchen Township, Middlesex Co., N. J., to National Lead Co., New York City.

U. S. Chemical Patents

Off. Gaz.—Vol. 497, Nos. 1, 2, 3, 4—p. 82

Preparation white pigment, first calcining together mixture of reactive zinc compound and titanium dioxide. No. 2,140,235. Ekbert Lederle, Ludwigshafen, Max Gunther, Mannheim, and Rudolf Brill, Heidelberg, Germany.

Preparation pigmentary metallic titanate, first preparing uniform and intimate mixture of "reactive metal compounds" "and "reactive titanium compounds" by mutual precipitation from aqueous media. No. 2,140,236. Ekbert Lederle, Ludwigshafen, Max Gunther, Mannheim, and Rudolf Brill, Heidelberg, Germany.

Manufacture zinc sulfide; introducing zinc vapor, an inert carrying gas and sulfur into a reaction zone, maintaining zinc vapor and carrying gas at temperature above 1060° C. No. 2,140,668. Harlan A. Depew and Wm. T. Maidens, Columbus, O., to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Solid marking implement for hot surfaces, comprising a pigment, a carrier, and an acidic bonding or fixing agent. No. 2,141,965. Lester Aronberg, Chicago, Ill.

Production stable latex of high concentration. No. 2,140,198. Ernst Benzing and Johannes Jaenicke, Frankfort-am-Main, Germany, to Revertex, Ltd., London, England.

Method treating rubber; vulcanizing same in presence of an accelerator which comprises a reaction product of an aldehyde and an alicyclic primary amine. No. 2,140,258. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

Method accelerating vulcanization of rubber; carrying out process in presence of a compound of the formula R-NH-X-OH, in which X is an alkylene and R is an alicyclic radical corresponding to the benzene and naphthalene series. No. 2,140,259. Albert M. Clifford, Stow, O., to Wingfoot Corp., Wilmington, Del.

Gas-expanded rubber product, having an individual cellular structure and containing hydrogen sulfide gas. No. 2,140,552. Dudley Roberts to Rubatex Products, Inc., both of New York City.

Production chlorinated rubber; pretreating solution of rubber in a volatile solvent with chlorine. No. 2,140,715. John M. Peterson, Kennett Sq., Pa., to Hercules Powder Co., Wilmington, Del.

Resins, Plastics, etc.

Process for improving resins and fatty oils. No. 2,139,081. Herbert Honel, Vienna, Austria, to Helmuth Reichhold (Reichhold Chemicals), Detroit, Mich.

Preparation organic plastic composition. No. 2,139,369. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Manufacture aldehyde condensation products, by causing phenol to react with formaldehyde in presence of a non-cyclic alkylene polyamine as the condensing agent or catalyst in catalytic proportion. No. 2,139,-418. Nathan M. Mnookin, Kansas City, Mo.

Preparation esters of hydrogenated abietyl alcohol. No. 2,139,588. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Manufacture urea-formaldehyde molding compositions. No. 2,140,560. Leonard Smidth, New York City, to Luco Products Corp., Brooklyn, N. Y.

Manufacture urea-formaldehyde condensation products. No. 2,140,561. Leonard Smidth, New York City.

Manufacture solutions of a polymerized vinyl compound. No. 2,140,-921. Herbert Rein, Leipzig, Germany, to I. G., Frankfort-am-Main, Germany.

Molding powder comprising hexamethylene-tetramine and a fusible condensation product of an aldehyde with a pine wood pitch. No. 2,141,043. Cornelis Maters, The Hague, Netherlands, to Hercules Powder Co., Wilmington, Del.

Light-colored, high-melting point, phenolic-acetaldehyde resin, adapted for use in varnish making and for coating compositions. No. 2,141,198. John B. Rust, Orange, N. J., to Ellis-Foster Co., corp. of N. J.

Plastic resinous composition of matter comprising a homogeneous mixture of a resin and paraffin wax. No. 2,141,575. Harold Warp, Chicago, Ill.

Production plasticizing product or plastic; subjecting an unsaturated fatty acid obtainable from oils of the class of linseed, perilla, fish, tung, and oiticica, to oxidizing treatment in presence of a liquid hydrocarbon solvent. No. 2,141,885. Henry P. Strauss, New York City, to Woburn Degreasing Co. of N. J., Kearny, N. J.

Production phenolic acetaldehyde resin. No. 2,142,076. John B. Rust, Orange, N. J., to Ellis-Foster Co., corp. of N. J.

Production alkali-resisting phenolic aldehyde siccative composition. No. 2,142,077. John B. Rust, Orange, N. J., to Ellis-Foster Co., corp. of N. J.

Production initially light colored phenol-acetaldehyde resin. No. 2,142,-078. John B. Rust, Orange, N. J., to Ellis-Foster Co., corp. of N. J.

Rubber

Preservation rubber by treatment with product obtained by reacting one molecular proportion of a N, N' diaryl phenylene diamine with not more than two molecular proportions each of an aliphatic aldehyde and an alcohol, in presence of a condensing agent. No. 2,134,139. Geo. D. Martin, Nitro, W. Va., to Monsanto Chemical Co., Wilmington, Del.

Preparation an uncoagulated readily-able, unmasticated, non-agglomerated rubber compound. No. 2,139,724. Jos. Herbert Coffey, Rhos-on-Sea, North Wales.

Manufacture cellular rubber from aqueous dispersions thereof. No. 2,140,026. Edw. Arthur Murphy and Evelyn Wm. Madge, Birmingham, England, to Dunlop Rubber Co., London, England.

Process promoting breakdown of rubber by treating crude rubber with hydrazine. No. 2,136,373. Warren F. Busse, Cuyahoga Falls, O., to B. F. Goodrich Co., New York City.

Rubber tire having protective coating for an exposed surface comprising a flexible, neutral, water soluble paint in a dried condition. No. 2,136,567. Cornelius W. Smith, Detroit, Mich., to United States Rubber Products, Inc., New York City.

Rubber composition comprising rubber having compounded with it soluble and diffusible cleavage products, obtained by the hydrolytic decomposition of mixture comprising epidermis of hogs and other foreign matter. No. 2,136,771. Chas. H. Campbell, Kent, O.

Acceleration of vulcanization of rubber. No. 2,136,949. Ludwig Orthner, Leverkusen-am-Rhine, and Ewald Zaucker, Cologne-Mulheim-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production rubber articles and materials; comprising vulcanized natural rubber bonded to a vulcanized synthetic rubber-like material. No. 2,137,686. Bernard James Habgood, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Process for enriching rubber latex; treating same with alkali salts of polyacrylic acids. No. 2,138,073. Otto Eduard Schweitzer, Hochst-am-Main, Germany, to Revertex, Ltd., London, England.

Production sponge rubber from aqueous rubber dispersions. No. 2,138,081. Hans Wolf, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Synthetic rubber composition including polymerized chloroprene and a gasoline insoluble chlorinated paraffin wax, characterized by high resistance to swelling in gasoline. No. 2,138,192. Emil Ott to Hercules Powder Co., both of Wilmington, Del.

Method retarding deterioration of rubber, by treatment with a monoalkyl ether of hydroquinone in which the alkyl group is a straight chain group containing at least 4 carbon atoms. No. 2,138,924. Paul C. Jones, Akron, O., to B. F. Goodrich Co., New York City.

Plant and process for manufacture rubber hydrochloride. No. 2,138,-932. Eugene W. Moffett and Herbert A. Winkelmann, Chicago, Ill., and Floyd E. Williams, Gary, Ind., to Marbon Corp., corp. of Del.

Textiles

Continuous process for manufacture staple artificial fibers; subjecting threads, during process, to an after-treatment, such as washing, bleaching, etc., with treating liquids. No. 2,134,160. Oscar Freiherr von Kohorn zu Kornegg, Chemnitz, Germany.

Process for increasing slip resistance of fabrics, by treatment with solution containing oxalic acid and a phosphate of a trivalent metal. No. 2,134,579. Otto Rohm, Karl Schottenhammer, and Erich Groner, Darmstadt, Germany, to Rohm & Haas Co., Phila., Pa.

Spinneret for production of rayon from viscose, comprising at least 90 per cent. platinum and 1 per cent. rhodium. No. 2,135,611. Reginald V. Williams, Buffalo, N. Y., and Edw. R. McKee, Hermitage, Tenn., to du Pont, Wilmington, Del.

Process improving homogeneity of a mixture of pigment and spinning solution in the forming of pigmented artificial filaments or yarns. No. 2,136,201. Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, corp. of Del.

Preparation tubular artificial textile threads. Nos. 2,136,462-3-4. Rene Picard, Lyon, and Rene Fays, Villeurbanne, France, to Societe Alsa in Basle, corp. of Switzerland.

After treatment of dyeings on cellulose fibres. No. 2,136,757. Hans Roos, Leverkusen-I. G. Werk, Germany, to General Aniline Works, New York City.

Purification raw wool; treating same with a compound able to dissolve wool fat, selected from the group of hydrocarbons and halogenated hydrocarbons. No. 2,137,823. Jos. Nusslein and Jurgen von Klenck to I. G., all of Frankfort-am-Main, Germany.

Process coating one side of a fabric with a waterproof coating, embossing coated fabric, wetting out, in final step coating uncoated side of the dry, wetted-out, embossed coated fabric with a pressure-sensitive adhesive. No. 2,137,969. Raymond Einnon Thomas, Newburgh, N. Y., to du Pont, Wilmington, Del.

Apparatus for spinning rayon. No. 2,138,394. Wilhelm Wuppermann, Berlin-Zehlendorf, Germany.

Process for improving fastness of dyeings which have been prepared on cellulose materials by means of substantive dyestuffs, by aftertreating them with solutions containing products containing a pyridine radical. No. 2,138,457. Ferdinand Munz, Frankfort-am-Main, and Karl Keller and Otto Trosken, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, New York City.

Process for improving fastness of substantive dyeings. No. 2,138,-458. Ferdinand Munz, Frankfort-am-Main, and Karl Keller and Otto Trosken, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, New York City.

Process of rubberizing thread or fabric containing regenerated cellulose. No. 2,139,389. Jos. I. Taylor and Karl T. Schaefer, Elizabethton, Tenn., to North American Rayon Corp., New York City.

Production artificial cellulosic materials having a mat appearance, first incorporating in cellulosic spinning solution an emulsified suspension of an organic substance. No. 20,953. Reissue. Johann Jos. Stoeckly, Teltow-Seehof, and Erhard Witte, Berlin-Lichterfelde, Germany, to North American Rayon Corp., New York City.

A non-puckering, heat-resisting, lint-less clothes pressing fabric for use in a machine in which pressing is carried out at a temperature as high as 250° F. and in the presence of high humidities. No. 2,141,396. Harry H. Levin, New York City, to du Pont, Wilmington, Del.

Method treating natural or finished artificial textile fibres to enhance their fitness for working and to improve their quality, by application of an emulsion of alcohol of the group consisting of the primary aliphatic alcohols containing 8 to 30 carbon atoms in the molecule and the naphthenic alcohols, with a sulfonate of an alcohol of such group. No. 2,141,-845. Walther Schrauth, Berlin-Dahlem, Germany.

Manufacture artificial fibres and films having an increased affinity for dyes; adding to the solution of an organophil colloid an artificial resin containing an alkylating group, treating formed product with compound from the group of amines and amine derivatives. No. 2,142,007. Paul Schlack, Berlin-Treptow, Germany, to I. G., Frankfort-am-Main, Germany.

Water, Sewage, etc.

Process removing both acid and fluorine from water, using a granular hydrated metallic oxide in gel form in process. No. 2,139,227. Paul C. Goetz, Mount Holly, N. J., to Permutit Co., New York City.

Process of making from glauconite a radically altered product having greater operating exchange power in water softening and capable of being regenerated with radically less salt per unit of hardness removed from the water. No. 2,139,299. Wm. McAfee Bruce, Mt. Holly, N. J., and Ray Riley, Long Island City, N. Y., to Permutit Co., New York City.

Method destroying sewage. No. 2,139,419. Henry H. Moreton, Santa Monica, Calif.

Composition for controlling or killing algae in water made from a mixture of equimolecular amounts of a water-soluble copper salt and a water-soluble ammonium salt. No. 2,140,401. Gail J. Fink, LaGrange, Ill., to National Aluminate Corp., Chicago, Ill.

Recovery fluorine compounds from water vapor containing volatile fluorine compounds. No. 2,141,773. Walter Strathmeyer, Oppau, Germany, to I. G., Frankfort-am-Main, Germany.

Process for treating sewage to purify same. No. 2,141,979. H. Orin Halvorson and Randolph L. Smith, St. Paul, Minn.